Université de Montréal

Strategic planning for temporary housing: 1999 earthquakes in Turkey
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Thèse présentée à la Faculté des études supérieures
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AVIS

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Université de Montréal
Faculté des études supérieures

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Strategic planning for temporary housing : 1999 earthquakes in Turkey

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ABSTRACT

Temporary housing after disasters is the outcome of a complex process that merits attention in its own right; it is distinct from, yet interrelated with, the process of reconstruction. Some forms of temporary housing projects have been instigated after most major disasters in the past 40 years, but many projects have experienced similar problems, such as high cost, lack of cultural suitability, unsatisfactory locations and permanence, all of which translate into their being a burden on the communities they were intended to help recover. Many of these problems can be attributed to a lack of planning, especially at the strategic level, before the disaster occurs.

This research explores how temporary housing projects are defined, how they are organized and managed, and what their later impacts are on urban development. These factors are used as a basis for defining issues to be addressed in strategic planning. The research is comprised of four articles, which have been published in scholarly journals and also includes sections on previous research and on methodology, and provides a synthesis of the overall findings. The overarching methodology used is that of the qualitative case study, coupled to the systems approach. The logical framework is used to define the project processes and to evaluate the project impacts.

The temporary housing programme after the 1999 earthquakes in Turkey is the main case study, in which the government and NGOs built almost 42,000 temporary housing units to house the affected families from two major earthquakes which affected the industrial region to the east of Istanbul. In order to develop a comparative framework, this research also draws on other case histories of recent temporary housing programmes, such as those in Mexico, Italy, Colombia, Japan, Greece and the United States.

The research brings to light new ideas: 1) temporary housing projects are strongly influenced by the organizational and building culture of the countries in which they are implemented; 2) timely and well-organized procurement is a key step, in which finding satisfactory sites for temporary housing remains one of the largest problems; 3) after temporary housing has served its initial purpose, it does not need to become a burden but can instead be a valuable resource of low-cost housing in a place where housing is in short supply. Overall this research proposes a strategic planning framework and offers guidance about organizational design, technical design and project processes that need to be incorporated into the strategic planning for temporary housing projects.

Keywords: disasters, temporary housing, reconstruction, strategic planning, project management, systems approach, logical framework.

RÉSUMÉ

Les logements temporaires après les catastrophes naturelles résultent d'un processus très complexe qui, malgré leur singularité, exigent une intégration dans le processus de reconstruction. Les projets de logements temporaires construits après presque tous les désastres dans les 40 dernières années présentent tous les mêmes inconvénients: coûts trop élevés, designs inadaptés à la situation socioculturelle, emplacements peu convenables et, surtout, permanence. Il en résulte que les projets sont devenus des fardeaux pour les communautés. Plusieurs de ces problèmes peuvent être attribués au manque de planification stratégique avant les catastrophes.

Cette recherche vise à définir ce que représente le logement temporaire, comment les projets sont organisés et gérés, et quels sont leurs impacts sur le processus de développement urbain. Ces informations sont utilisées comme référence de base pour définir les paramètres les plus importants pour la planification stratégique du logement temporaire. Cette recherche inclut quatre articles, publiés dans des revues scientifiques, une revue de la littérature, une description de la méthodologie utilisée et une synthèse qui comprend une discussion générale des résultats obtenus. La méthodologie employée est basée sur des études de cas qualitatives reliées à une approche systémique. La définition du processus du projet et l'évaluation de ses impacts reposent sur la technique dite du «cadre logique».

Le programme de logement temporaire après les tremblements de terre qui ont eu lieu en Turquie en 1999 sert de cadre à cette recherche. Dans ce cas particulier, le gouvernement de Turquie et les ONGs ont construit environ 42 000 unités de logement temporaire pour reloger les familles frappées par deux tremblements de terre majeurs situés dans des régions industrielles à l'est

d'Istanbul. Pour établir des comparaisons, d'autres études de cas au Mexique, en Italie, en Colombie, au Japon, en Grèce et aux États-unis ont été étudiées.

Cette recherche permet de souligner que : 1) les projets de logements temporaires sont grandement influencés par la culture organisationnelle et par l'industrie du bâtiment dans les pays où ils sont implantés; 2) un approvisionnement au moment adéquat et une bonne organisation sont des étapes-clés pour assurer le succès d'un projet; cependant le plus grand problème est de trouver l'emplacement le plus approprié; 3) en effet, les unités de logement temporaires peuvent devenir une source importante de logements abordables pendant plusieurs années, même s'ils ont déjà servi à d'autres victimes de catastrophe. D'une façon générale, cette recherche propose un cadre de planification stratégique et offre des suggestions pour le design organisationnel et le design technique, et pour le déroulement des processus du projet qui doivent être inclus dans la planification stratégique des logements temporaires.

Mots clés : catastrophes naturelles, logements temporaires, reconstruction, planification stratégique, gestion de projets, approche systémique, cadre logique.

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CHAPTER 1: INTRODUCTION

What exactly are the issues surrounding planning and management of post-disaster temporary housing projects? Why is this subject so important, particularly today?

By way of an introduction to answering these questions, let us take a look at an extraordinary case of a haphazard approach to post-disaster temporary housing, with consequent waste of resources in a supposedly rich and efficient country.

1.1 The example of FEMA mobile homes at Hope Arkansas

The temporary housing programme for last year's hurricane Katrina in the United States provides an apt example of why and how strategic planning is needed for temporary housing:

As is well known, Hurricane Katrina wiped out large areas of New Orleans and the Louisiana coastline in August 2005, devastating the region and forcing residents to flee from their destroyed homes for public shelters. As had been the practice in past disasters on American soil, the U.S. Federal Emergency Management Agency (FEMA) made the decision to buy, from private suppliers, mobile and modular homes to temporarily house the affected families close to their communities during the rebuilding process. FEMA reports on their website, that one year after the hurricane, 950,000 families have applied for disaster housing assistance and it has distributed over 100,000 temporary housing units to affected families.

However, an internal review by the U.S. Department of Homeland Security (2006), about the mobile and modular homes to be distributed from two

storage sites at Hope (Arkansas) and Red River (Texas), states that FEMA purchased 24,967 manufactured houses and 1,295 modular homes at a cost of about US$35,000 each, totalling just under US$900 million. The private manufacturers supplied the homes to the sites in a timely manner; however FEMA only distributed half the homes to disaster-affected families and almost one year after the hurricane, half the units remain in the Arkansas and Texas storage facilities. The costs to maintain the storage facility, including the land lease, road maintenance and security are US$2 million per year, or US$167,000 a month. (Incidentally, due to the vast numbers of houses there—more than 10,000—the storage facility at Hope Arkansas has become a local tourist attraction).

The U.S. Department of Homeland Security (2006), stated that "FEMA did not have a plan for how the homes would be used before they purchased them," and cited several reasons why the homes had not been distributed to awaiting families:

- Most of the area affected by the hurricane is in a flood zone and federal regulations prohibit placing these types of homes in floodplains, which is where many of the evacuees would like to have them. FEMA could have supplied travel trailers, which are smaller mobile homes that can be towed by normal vehicles and are allowed on the floodplains, however, FEMA did not purchase these types of homes in this case.
- FEMA did not have a specific number of how many homes would be necessary; consequently they may have purchased many more homes than were needed, at a considerable cost to the disaster relief effort.
- Many local officials did not want manufactured homes in their communities, thus refused to make land available for them.
- Many of the homes would not be accepted in typical mobile home parks because they were too large and they also required a special

permit to be hauled. The size was actually larger than FEMA's own guidelines for such homes.

The U.S. Department of Homeland Security's states recommendations for FEMA: "for future disasters, develop written policies, procedures, and plans to govern the acquisition and use of mobile and modular homes…also, FEMA should work with state and local governments to identify prearranged sites that could be used for mobile homes. FEMA should not wait until a disaster strikes to identify possible sites for the homes"

This brief case history illustrates a revealing fact—that even FEMA, a national organisation dedicated to disaster management, which has decades of experience in emergency housing provision—appears to lack some basic strategic planning procedures for temporary housing.

1.2   The "problématique" for temporary housing

The delivery of safe and affordable housing remains one of the most challenging aspects of any post-disaster recovery programme, and temporary housing is a distinct and complex component of housing reconstruction, requiring attention in its own right. Similar problems are recurring across different cases of temporary housing, which point to an unmistakeable need for up-front strategic planning to tackle the process of temporary housing.

In a disaster situation, such as an earthquake, hurricane, tsunami or flood, where large stocks of housing are damaged or destroyed by the event, it is most often the poor who are most vulnerable. The poor are more likely to live in precarious locations, such as on alluvial soils, in ravines or on flood planes, and often their housing is less durable and more susceptible to the disaster's impacts (Davis, 1978). Also, it is the poor who will be more severely affected by a disaster because they have less access to cash, insurance, jobs or other

resources that are needed for them to rebuild their lives (Anderson and Woodrow, 1989; Blaikie et al., 1994). While higher income people are able to rebuild their houses more quickly, it is the poor (especially renters) who are left out of housing programmes—or have no choice but to wait years before a suitable arrangement can be found (Comerio, 1998).

In the immediate aftermath of the disaster there are basic needs that must be met: rescuing survivors, burying the deceased, the providing water, food, shelter, sanitation, and medical attention. To meet these basic needs, the military, aid organisations such as the Red Cross, Oxfam, Médecins sans frontières and local groups spring into action providing within days—in the best-case scenario—the necessary supplies and services to sustain life. In terms of sheltering, this usually means building tent camps in the affected area, or evacuating people to tent camps erected in accessible areas. Also, where possible, public buildings will be commandeered as shelters, housing families collectively in often-overcrowded facilities. However, if possible, people will avoid these kinds of shelters if they are able to make other arrangements (Quarantelli, 1982; Drabek, 1986).

Once these basic needs have been met and the danger has subsided, clean up and recovery can begin in earnest. If the area is inaccessible due to weather or topography, as in Kashmir in 2005, it may take several months before clean up and recovery can even begin.

However, the situation described above begs the question: In terms of housing, what are the steps to recovery? Most people agree that recovery should occur as quickly as possible, steps should be taken to reduce the vulnerability to future disasters, and it should all be an egalitarian process (Cuny, 1983). Most experts would also agree that rebuilding permanent housing as quickly and as efficiently as possible is the best way to achieve housing recovery (Davis, 1978; UNDRO, 1982). Although enabling, or

actually physically building, permanent housing is the goal of governments and communities after most disaster situations (unless there is a political motivation to remove the population), there is often a need for an interim housing solution to house people in the—often-lengthy—time between immediate sheltering and permanent housing.

The living situation in collective centres (camps or public facilities) is such that families are, respectively, crowded into a small tent, which can be cold in winter, or must share a large room with dozens of other families where there is a general lack of privacy (Harada, 2000). While tolerable for a short period of time, it is found that the dependency relationship that is fostered in these collective centres will negatively impact on the recovery of families if they must stay there over a long period of time.

Therefore, the difficulty of living in camps or in collective centers, coupled with the length time needed for permanent reconstruction makes some type of interim housing solution, or temporary housing, necessary after most disasters. In physical form, temporary housing can mean staying with family or friends, renting an apartment, building a shelter near the destroyed home, having access to a mobile home or to a housing unit provided by a competent authority. Whatever the physical type, in temporary housing, families have a chance to restart their daily domestic activities and regular routines of school and work. According to Quarantelli (1982) the stage of temporary housing promotes the reestablishment of daily household routines but with the understanding that permanent quarters will be eventually obtained.

While there are advantages of temporary housing for recovery, there are many criticisms about how temporary housing programmes have been executed, especially programmes in which the government or NGOs provide families with a temporary house expressly provided as part of a temporary

housing-building programme. Some of the main criticisms with temporary housing are:

- Cost of temporary housing, and the services that necessarily accompany it, is very high in relation to the cost of permanent housing, meaning that building temporary housing amounts to building twice over;

- Temporary housing usually takes much longer than expected to procure. This can mean that people find other housing in the meantime, or that permanent housing is delayed;

- Unit designs are insensitive to the way people live;

- Locations for temporary housing are often very inconvenient or transportation to and from them is inadequate;

- Temporary housing becomes permanent and a perceived as blight on the city.

The disfavour of temporary housing as part of the recovery strategy is understandable due to the recurring problems faced by temporary housing programmes. However, despite these well-known problems, temporary housing programmes continue to be implemented after most recent large-scale disasters (for example, in Japan, Mexico, USA, Turkey, Indonesia, India, Sri Lanka, Italy, Greece). When the time comes to be making a decision about whether to engage in accelerated reconstruction or to build temporary housing followed by permanent housing, governments and affected people inevitably feel that temporary housing is necessary for recovery, but as this research will show, the accompanying decisions are most often made in the absence of proper information and in a situation of disorganisation and chaos.

This research does not accept that the criticisms of temporary housing are inherent in the phenomenon, but rather that better planning and design can increase the likelihood of successful temporary housing programmes. This

research therefore takes a critical look at the problems in temporary housing, offering the systems approach to strategic planning as a method to avoid many of the problems and to increase the efficiency and sustainability of temporary housing.

1.3 The Rationale of the study and its parts

This dissertation is composed of five chapters, which, including the present introduction, consists of a review of previous research, an outline of the methods, a presentation of four published scholarly articles on the subject, and a general discussion that synthesizes the main findings.

Chapter 2, Previous Research, is an overview of research findings on the subjects of: (1) current practices regarding *housing in developing countries*, (2) concepts concerning the social studies of *disasters*, such as vulnerability, mitigation and preparedness, and recovery, (3) *post-disaster reconstruction*, especially aspects relating to planning and managing projects and (4) the knowledge about practices of *temporary housing* and a discussion of the related problems.

Chapter 3, Methods, presents the overall *research design*, a description of the *case study method*, and details of the *data collection*. As well, this section outlines, in detail, the methods used for *data analysis* in the articles. The approach of *systems thinking* is used throughout the research as a tool to understand the complexity of factors in temporary housing. Other methods explained are: *Typology building*, used to categorise different types of temporary housing, and the *Logical Framework Approach* and *impact evaluation* employed to understand the processes of temporary housing projects and their outcomes.

Chapter 4 contains four articles, which make up the body of this dissertation. Each of the articles has been published in a reputable scholarly journal, or has been accepted for publication, except for Article I—which is a peer-reviewed conference paper, published in the conference proceedings.

Article I discusses the different physical types of temporary housing used after the 1999 earthquakes in Turkey, including some examples of other types of temporary housing from other disasters. It also focuses on the implications of these types for planning and for their impacts on urban form. Titled, "Types of temporary accommodation after disasters: example of the 1999 Turkish earthquake," this paper was presented at The International Emergency Management Society (TIEMS) conference at the University of Waterloo in Waterloo, Canada, which was held from May 14-17, 2002.

Article II presents a strategic planning framework for temporary housing. Based on empirical data from six case histories, including the 1999 earthquakes in Turkey, this paper defines several issues that must be taken into account when planning for temporary housing. The paper, titled, "Strategic planning for temporary housing," is accepted for publication in the journal, *Disasters*.

Article III is focussed on the organisational design of temporary housing projects, and is based on two projects, one after the 1999 earthquakes in Turkey and another after the 1999 earthquake in Colombia. The paper shows how organisational design coupled with the appropriate housing technology impacts on the project. This paper, titled, "A Systems View of Temporary Housing Projects in Post-Disaster Reconstruction" was co-authored with Gonzalo Lizarralde and Colin Davidson and has been published in *Construction Management & Economics*.

Article IV is about the outcomes of temporary housing projects a few years later, once they have fulfilled their initial purpose as temporary housing. This paper takes a longitudinal look at four different temporary housing projects built in Turkey after the 1999 earthquakes to understand what becomes of the housing and the impacts this has on the cities, the municipal government and the residents. This paper, titled, "Impacts of prefabricated temporary housing after disasters: 1999 earthquakes in Turkey," has been accepted and published online by *Habitat International*, and is awaiting formal publication in the journal.

Chapter 5, General Discussion, is a structured discussion of the main aspects of this research, synthesised into 13 points. Also presented is a table offering recommendations for planning temporary housing at each of the project stages, from pre-disaster strategic planning to dismantling.

The example presented at the beginning of this chapter about the FEMA temporary housing exemplifies the need for good planning for temporary housing to increase the efficiency and sustainability of reconstruction processes. This study specifically focussed on temporary housing, and endeavours, in the following chapters, to identify the main concerns of planning and management that can improve the application of temporary housing.

CHAPTER 2: PREVIOUS RESEARCH

2.1 Housing in developing countries

Many approaches have been implemented in the search for good strategies about how to effectively manage the wild spread of slums in most developing country cities. Nonetheless, the problems still persist. In 2006, UN Habitat announced that for the first time ever the world has more urban inhabitants than rural—a trend that will continue to increase in coming years. The reasons for this trend are largely political and economic and therefore outside the scope of this study. However the consequent problems of slum proliferation, in terms of urban housing and infrastructure, and the vulnerable built environment it creates is of central interest to this study. Of similar interest to this study, are these many approaches, developed by researchers, international organisations, governments and local communities, to address the urban housing problems.

Early international development initiatives into housing sought to alleviate slums by building large scale public housing projects. These projects not only failed to house the poorest people, but the style of housing did not suit local living customs. In the 1970s, John Turner, and other researchers of the day, found that the key to alleviating housing problems was to understand how slum dwellers or the poor were building their own housing, and to use that as a model (Turner, 1972, 1976; Abrams, 1966; Drakakis-Smith, 1981). Turner saw housing built in developing countries as a gradual process of construction whereby housing would be improved over time as the households had resources to put into it. The role of the government or outside agencies was to help people have access to land, to offer financing and to help to provide some of the infrastructure (Tipple and Willis, 1991). The eventual outcome of these observations became known as the "enabling

approach to self-help to housing," which has been adopted by many governments and international lenders such as the World Bank (1993b). Different schemes have been appropriated under this approach to self-help housing, such as:

- o Sites and services projects—where families are given a plot of serviced land that they then build upon gradually;
- o Core housing—a very basic house (of one or two rooms) is provided, usually unfinished, to be completed by the family.
- o Slum up-grading—squatters achieve some long-term tenure rights and organise (often with government or outside agencies) the installation of necessary infrastructure.

Land tenure is one of the most pervasive issues in the development of sustainable housing in developing countries and those who criticise the enabling approach have said that 'enabling' does little to help those people in informal land markets who are essentially squatting (Payne, 2001). In urban areas throughout the developing world, forced evictions continue to the present day. Millions of people live on land that they do not hold title to and can be forced off at any time. One aspect of this, which is pertinent here, is that insecure land tenure leads to little investment in house upgrading, leaving communities persistently more vulnerable to natural disasters. If a disaster does strike, families have little recourse but to rebuild where they once were, that is to say, with the same level of vulnerability. The difficulties of these landless families have implications for temporary housing and for post-disaster housing reconstruction in general.

2.2 Disasters

The study of disasters is a multi-disciplinary subject that builds on a wide range of substantive areas such as physical sciences, engineering, social sciences and business administration. However, the previous research in

disasters that is of interest here is that dealing with the social aspects of the built environment, which comes mainly from social sciences, such as planning, geography, sociology, political science and economics as well as from architecture.

Research on disaster management has identified different phases of activity after a disaster (Haas, 1977; UNDRO, 1982); the five main phases of disaster management are:

1) *Relief* in the immediate aftermath of a disaster including search and rescue, meeting survivors' basic needs for water, food, medical care and shelter, and mitigating the impact of further hazard events.

2) *Rehabilitation*, which takes place in the later stages of relief, attempts to re-establish the community to its former living conditions or at least to a stable condition.

3) *Reconstruction* is focussed on permanency and sustainability and tackles longer-term problems such as adequacy of housing, infrastructure, utilities and the economy.

4) *Mitigation* is long-term reduction of vulnerabilities and can actually take place before a disaster; however it is often spurred on by a recent disaster in a region;

5) *Preparedness* also takes place before the disaster and includes activities and actions to minimise damage and losses in case a disaster does strike.

Pertinent research—available from a small group of important texts, a few journals dedicated to the issues related to disasters, and from conference proceedings—leads to the specification of important themes of research on the social issues of *Disasters*. While these themes overlap in many ways, they are organised in the following manner in this section: *Vulnerability, Mitigation and Preparedness*, and *Recovery*. Subsequently, the overarching theme of this research, *Post-disaster Reconstruction,* is presented with the

following sub-themes: *Strategic Planning, Approaches, Stages and Strategies*, and *Project Planning and Management*. The last section deals with the central theme of the research, which is *Temporary Housing*.

2.2.1 Vulnerability

The concept of vulnerability

Vulnerability, as a widely studied concept, emerged as a response to the narrowly defined *hazards paradigm*. The *hazards paradigm* saw disasters as physical agents (in the natural or artificial environment) that pose threats to the human environment (Hewitt, 1997). It was concerned with the nature of those threats and the extent of the damage that they may cause.

In the 1980s, the idea of *vulnerability* was introduced as a way to incorporate the political economy into the idea of disaster risk; thus, vulnerability was put forth as a consequence of particular social, economic and political processes (Maskrey; 1989). The vulnerability approach, or as Hewitt (1997) called it, the 'human ecology of endangerment' emphasized how communities are exposed to danger or become unsafe because of the social geography of settlements and land uses, and the distribution of a community's power structures. Thus, disaster risk is seen to depend upon on-going societal conditions; society, rather than nature decides who is more likely to be exposed.

The idea of vulnerability allowed new, more concise definitions of *disaster*. In his book, *Shelter After Disaster* (1978), Ian Davis pointed out that disasters are in fact not caused by natural phenomena alone, but only *when natural phenomena strike a vulnerable built environment*. Maskrey (1989) points out that natural disaster is the coincidence between a hazard (or physical agent

such as an earthquake, flood, drought, bombing) and conditions of vulnerability; he offers the following equation:

Disaster risk = vulnerability + hazard.

More precisely, Blaikie, Cannon, Davis and Wisner (1994) suggest that a disaster occurs when a significant number of vulnerable people experience a hazard and suffer severe damage and/or disruption of their livelihood system in such a way that recovery is unlikely without external aid. 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 can render them more or less vulnerable (Blaikie et al., 1994).

Along with the concept of vulnerability comes the idea that disasters do not affect everyone equally, but are more like to affect certain groups of the population; depending on class, ethnicity, gender, disability, and age. Maskrey (1989) points outs that:

> Large numbers of people on the social and territorial periphery of the global economic and political system are seen to be disabled by unequal economic relationships which do not allow them to access to the basic resources such as land, food and shelter, necessary to stay alive. The empirical evidence from a large number of case studies, points to the fact that it is these groups who most often suffer disaster (3).

In the same vein, Hewitt (1997) suggests that power structures, or rather powerlessness, have a large impact on vulnerability—those who are more politically vulnerable will fare worse in a disaster.

Sources of vulnerability

Vulnerability can be understood in different ways because it arises from various circumstances of everyday life. Hewitt (1997) defines six basic forms of vulnerability:

1. *Exposure to dangerous agents* and environments
2. *Weaknesses*: predisposition of persons, buildings, communities or activities to greater harm
3. *Lack of Protection*: against dangerous agents particularly for weaker persons and items
4. *Disadvantage*: lack of the resources and attributes to affect risks or respond to danger.
5. *Lack of resilience*: limited or no capacity to avoid, withstand or offset and recover from disaster
6. *Powerlessness*: inability to influence safety conditions, or acquire means of protection and relief.

These forms of vulnerability have an impact on the level of risk the person, building or community has to being affected by a hazard, and also can help determine to what extent they will be incapacitated by the hazard—whether they can bounce back quickly or be completely devastated. Blaikie, and co-authors (1994) offer an interesting model for vulnerability by defining that the ability of people to deal with the impact of hazards is directly related to a given *household's access to resources* (see figure 1). The idea is that the more that a household has access to resources such as information, cash, means of production, tools, equipment, and social networks, the more likely they will be able to successfully recover from the impact of a hazard. This points out that disenfranchised households, who have little chances to find employment, are devoid of landownership, and political power will be less able to amass, themselves, the resources necessary for recovery—whether before the disaster occurs or after.
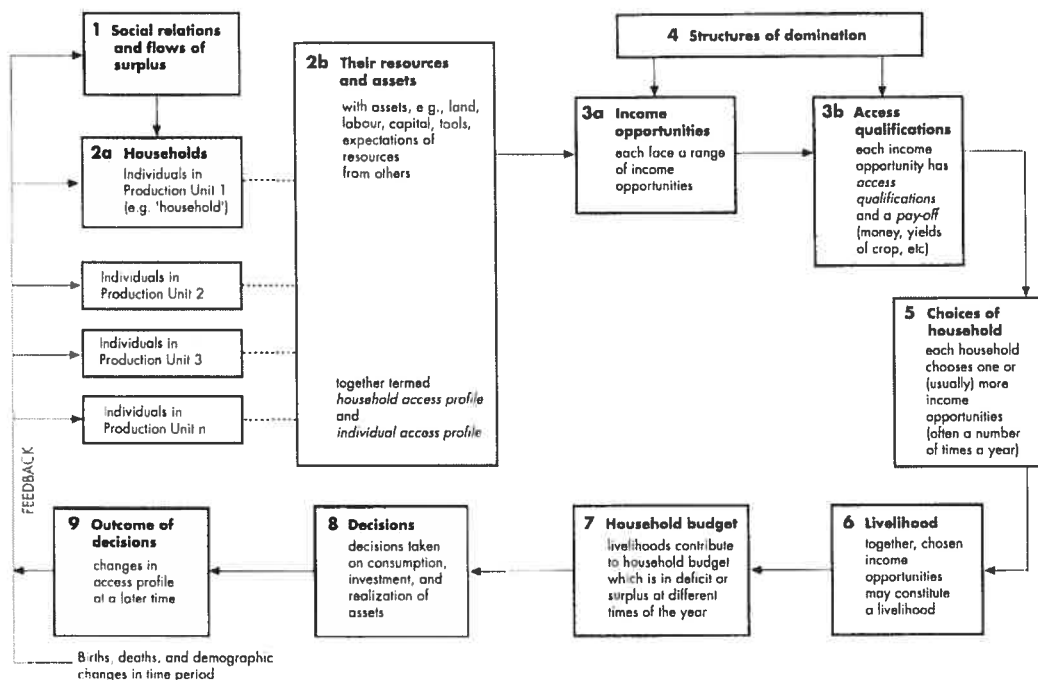
Figure 1 Access to resources to maintain livelihoods (source: Blaikie et al., 1994, p. 50)

Links between vulnerability and development

The link between vulnerability and development is a complicated yet important one. Development carries with it the idea that more development or better development reduces vulnerability. Development indicators show that access to education, health care, land and adequate housing can reduce people's vulnerability and therefore increase their ability to cope with disasters. In this light, Anderson and Woodrow (1989) see vulnerability is the opposite of 'security' or 'capability'—the ability to protect one's community, homes and family and to re-establish one's livelihood, and development as the process by which vulnerabilities are reduced and capabilities are increased (see figure 2).

	Vulnerabilities	Capacities
Physical/Material What productive resources, skills, and hazards exist?		
Social/Organizational What are the relations and organization among people?		
Motivational/Attitudinal How does the community view its ability to create change?		
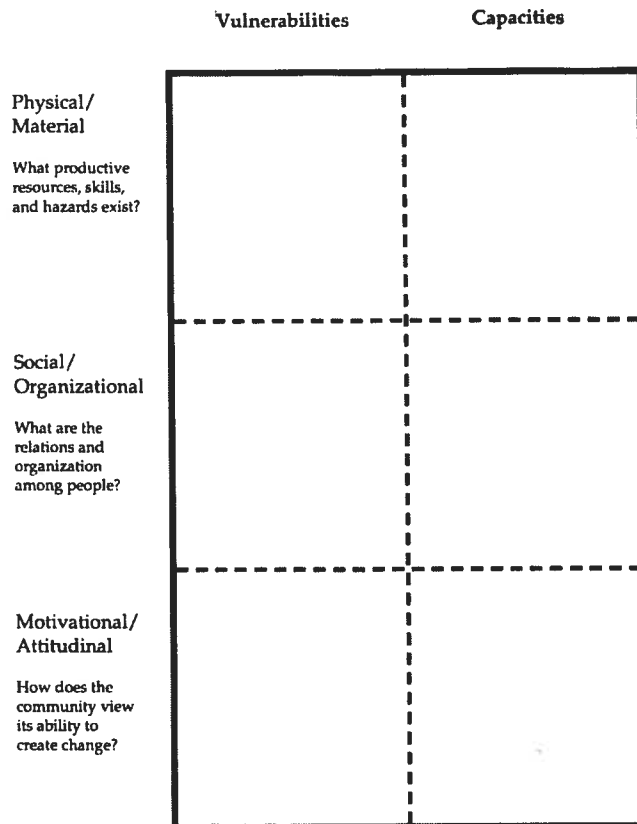
Figure 2 Capacities and vulnerabilities analysis matrix (source: Anderson and Woodrow, 1989, p. 12)

However, development does not always reduce vulnerability, and can in some cases, actually increase the degree of disaster risk in a community. Blaikie, and co-authors (1994) show how development processes that limit access to power and resources, or are governed by political and economic systems that do not favour equality, result in a progression of vulnerability. They call this the Disaster Pressure and Release Model, in which root causes, such as ideologies and power structures, lead to dynamic pressures in society, such as rapid urbanisation with lack of local institutions, that in turn cause unsafe or vulnerable conditions in the physical environment, economy, society and state (see figure 3). A disaster is created when the hazard strikes these vulnerable conditions. The release of these pressures is done by

addressing the vulnerabilities through mitigation and corrective measures at the level of dynamic pressures, or if possible, the root causes.

THE PROGRESSION OF VULNERABILITY

| 1 | 2 | 3 |

ROOT CAUSES | DYNAMIC PRESSURES | UNSAFE CONDITIONS | DISASTER | HAZARDS

Limited access to
• Power
• Structures
• Resources

Ideologies
• Political systems
• Economic systems

Lack of
• Local institutions
• Training
• Appropriate skills
• Local investments
• Local markets
• Press freedom
• Ethical standards in public life

Macro-forces
• Rapid population growth
• Rapid urbanisation
• Arms expenditure
• Debt repayment schedules
• Deforestation
• Decline in soil productivity

Fragile physical environment
• Dangerous locations
• Unprotected buildings and infrastructure

Fragile local economy
• Livelihoods at risk
• Low income levels

Vulnerable society
• Special groups at risk
• Lack of local institutions

Public actions
• Lack of disaster preparedness
• Prevalence of endemic disease

RISK =
Hazard +
Vulnerability

R = H +V

Earthquake

High winds (cyclone/ hurricane/ typhoon)

Flooding

Volcanic eruption

Landslide

Drought

Virus and pests

Figure 3 Pressures that create vulnerability and ultimately disasters (source: Blaikie et al., 1994, p. 23).

Current approaches to vulnerability

Following from the conceptual work on vulnerability in the 1980s and 1990s, vulnerability has come to take its place in applications of development projects and disaster mitigation programmes. A recent publication, titled, "Mapping Vulnerability," edited by Bankoff, and co-authors (2004) offers several examples of attempts toward incorporating vulnerability and vulnerability assessment in recent projects. In fact, vulnerability is one way of working towards community-based or empowering methods. They state:

Working with vulnerability requires a conceptual shift that is already beginning to find methodological application in community-based disaster

management programs and multi-stakeholder platforms. Such paradigms do more justice to the complex nature of vulnerability and step away from simplistic notions of intervention in which science is juxtaposed with a homogenous local body of knowledge (8).

One interesting perspective that has emerged is the idea that vulnerability is a concept of western discourse, as per Edward Said's (1979) 'Orientalism', and that labelling people 'vulnerable' is a political act. Bankoff (2001) argues that "development and vulnerability form part of one and the same [...] generalizing cultural discourse that denigrates large regions of the world as disease-ridden, poverty-stricken and disaster-prone" (p. 19).

The conceptual strength of vulnerability resides in its ability to clearly identify the relationship between factors that create risk and expose people to hazards. However, Lavell (2004) explains that vulnerability and risk are not heterogeneous and must be specifically understood in every local context. As is shown here, the creation and identification of vulnerability is a matter of great complexity and Wisner (2004) warns that we will fail to get to the heart of the matter of risk unless we create ways of analyzing the vulnerability implicit in everyday life.

2.2.2 Mitigation and preparedness

As the concept of vulnerability points out, disasters are not unforeseen events and techniques exist to predict when and where a hazard may strike and what kind of damage it may create. With these concepts in mind, it is possible to plan how to reduce the impact of a disaster. Planning may be defined as the process of preparing a set of decisions for action in the future directed at achieving goals by optimal means (Krimgold, 1974). Pre-disaster planning is a term used to describe a comprehensive range of efforts made to reduce the

destructive and disruptive effects of a disaster before it occurs. It consists of two main activities: mitigation and preparedness.

Mitigation

Disaster mitigation focuses on measures that can be taken to minimise the effect of a hazard and thus lessen the impacts of a disaster. Cuny (1983) identifies three steps in mitigation:

1) Reduce physical vulnerability
2) Reduce economic vulnerability
3) Reduce vulnerability of social structure

Specifically, physical vulnerability is addressed through a process of 1) risk mapping and micro zoning of risks; 2) identification of populated areas and identification of communities at risk; and then 3) addressing the risks through vulnerability reduction techniques. This third part is a political process whereby governments and communities must take action. Mitigation activities for addressing physical vulnerabilities can take the form of: flood defences, safe building design, legislation and public awareness; it can take place before a disaster occurs, during a disaster or during recovery and reconstruction.

Writing about earthquake mitigation, Comerio (2004) suggests that there are basically four categories for all earthquake hazard mitigation activities. These are:

- Land use regulations
- Building codes
- Insurance
- Public awareness campaigns

Land use regulation is when the government provides information on risks and hazards and encourages the use of planning practices to mitigate the impact of natural hazards. The information about hazard risks is usually given on a national scale and then it is up to local governments to implement the land use regulations. This is especially useful to discourage development on floodplains and on areas that are prone to landslide or liquefaction during earthquakes. However, local governments often find it difficult to enforce these kinds of regulations if it means foregoing needed property tax revenue.

Building codes try to improve design and construction techniques so that the built environment can withstand natural hazards. The correct design and implementation of building codes has a great capability to reduce the impact of earthquakes and other hazards. However, while designing a sufficient building code seems possible, enforcement of this building code can be a major problem in some countries; building codes in many developing countries have become too complicated and difficult to administer, and have lead to a breakdown in their functioning (Spence, 2004). In Turkey, it was found that the majority of the building stocks destroyed in the earthquake were new apartment buildings built within the last 20 years, but these buildings did not meet the code requirements. In many of the small towns, the municipality lacked adequately trained staff to interpret and apply the building regulations and nobody was liable for the safety of the buildings (Gülkan, 2001).

Natural hazards insurance tries to spread the burden of paying for post-disaster recovery to a wider group so it is not only the government or property owners that pay for damages to property. This is a pre-event precaution that provides repair funding by private insurers in the event that damage occurs to insured property, and therefore it spreads the burden of disaster recovery between the property owner, the insurer and the government. Insurance is widely used in developed countries were mortgage systems are also

widespread since banks demand that property owners have full insurance coverage. However in developing countries where mortgages are less common, property owners find it too expensive and have little motivation to purchase insurance.

Public information is a crucial mitigation tool because it creates a culture of mitigation that everybody is involved in—from all levels of government to institutions, private business and families. It essentially implies 'getting the word out' about preparedness activities such as safe building, emergency or contingency planning and the need for insurance. Often, governments will provide assistance to members of the community (businesses, institutions and families) to develop mitigation strategies.

Both Maskrey (1989) and Cuny (1983) point out that most mitigation activities, such as those that are described above, are top-down processes that are almost impossible to implement in a developing country context. Zoning and building codes are, for the most part, not enforceable and little headway has been made with costly retrofitting of non-engineered structures that make up the majority of their housing stock. Maskrey (1989) advocates a community-based approach to disaster mitigation in developing countries, which includes motivating or establishing organisations at the community level for meeting social needs; then through these community-based organisations (CBOs), building up awareness and consciousness of risks and educating people about safe building practices. Activities, which require substantial financial support, such as reinforcement of tenement buildings, can then be forced through with political pressure from the community, thanks to the clout of their CBOs.

Preparedness

"The underlying assumption of preparedness is that disasters are no time to be trying to decide what to do" (Cuny, 1983, p.205). Preparedness focuses on developing plans to respond to a disaster while it is occurring, or once it has occurred. In its simplest form preparedness is an estimation of emergency needs and the resources required to respond to those needs. In a more sophisticated sense, it is a plan to structure the entire post-disaster response including the following objectives: a) To get maximum benefit from relief activities and make a quick transition from emergency assistance to rehabilitation and reconstruction and b) to make sure all activities make a contribution to ongoing development (Cuny 1983).

To be a successful implementing instrument, Cuny (1983) suggests that an emergency preparedness plan must meet the following requirements:

1) It must present the sequence of activities in a logical and clear manner
2) It must be comprehensive and balanced
3) It must assign specific tasks and responsibilities for each
4) It must link appropriate organisations and establish mechanisms to bring people and organisations together at the critical points
5) It must reflect the policies of the implementing agencies or national government in a disaster.

Typical activities include emergency period necessities such as: warnings, evacuation, stockpiling, emergency plans for hospitals, emergency command control and communication systems, training for search and rescue and first aid. However, preparedness can also extend into thinking about and planning for disaster recovery and establishing reconstruction standards and policies.

2.2.3 Recovery

Recovery after disasters is a complex social process that, as stated by Cuny (1983), includes three distinct aspects:

- Emotional recovery,
- Economic recovery: replacement of income, restoration of jobs/means of production, markets; and
- Replacement of physical losses: personal belongings, home, and possibly land.

In addition to this, Bolin (1982) also includes a category of recovery called *quality of life*. In his studies on family recovery after disasters in the United States and Latin America, Bolin distinguishes between two components of family recovery: one labeled *housing recovery*, refers to whether a family establishes housing equivalent to that occupied prior to the disaster; the other labeled *family recovery*, which references a family's evaluation of its overall post-disaster situation. Among other things, he finds that economic recovery is a precondition for emotional recovery but that the greatest key to affecting recovery is the ability of the household to access housing aid (Bolin, 1993).

Caporale (1989) has argued that problems of recovery and reconstruction reflect not just the nature of damage, but the entire complex of socio-cultural and political-economic characteristics of the social order, especially the historical trends in an area. Other researchers echo this comment; Bolin (1993) finding that some households recover more quickly in some dimensions that others; Peacock and co-authors (1987) determined that social class is a factor, having an important impact on the type of housing and aid received and subsequently on the levels of recovery obtained.

While all forms of recovery are linked to one another, it is possible to single out housing recovery as an important, if not the most important, factor in the recovery of a family after a disaster. Some researchers use the term 'housing recovery' as a synonym for 'reconstruction'; however it is possible to make a distinction between these terms since *housing recovery* is actually the outcome of the activity of *housing reconstruction.* Once housing reconstruction has taken place, it is hoped that a family will achieve housing recovery.

2.3 Reconstruction

Housing reconstruction after disasters is a complex process that received a lot of attention in the late 1970s and early 1980s, but since then has had less attention in programming than other aspects of relief and recovery (Barakat, 2003). Conferences organised by i-Rec (see i-Rec 2002; i-Rec 2004; i-Rec 2006) have tried to address this issue, bringing housing and reconstruction once again to the forefront of discussions between researchers and practitioners. The following section outlines the main issues in reconstruction of primary importance to study of strategic planning for temporary housing.

2.3.1 Strategic planning

Checkoway (1986), in the introduction to his book, *Strategic Perspectives on Planning Practice*, calls for a change in city planning practices that pushes policies to be more well-defined and specifically directed regarding methods of implementation. He states:

> Strategic planning is a process that includes skills to set objectives, develop plans, build support and mobilize resources toward goals. It involves choice and sequence, staging and timing and a combination of roles and styles. It shows a commitment to think ahead, anticipate alternatives, and consider what may result from current decisions. It thus deals with the future of the present and represents an effort to act in accordance with images of the future and implementation in mind (3).

Strategic planning, like any other type of planning, takes time and careful consideration to be thought out thoroughly and implemented effectively. This is especially true in the bureaucratic context such as a large organisation or a government agency. Research on public sector planning in the United States shows that those responsible for planning consistently act as technicians and avoid political thinking or action. They see the environment of planning in terms of information and sources of information that may assist them in rational problem solving (Baum 1986). However, this is a somewhat naïve perspective and unfortunately renders less useful the applicability of public sector planning. Checkoway (1986) addresses this in the introduction to his book, saying that "planning operates in a political context and planners must think and act strategically to be effective" (p.2).

The housing recovery that is needed quickly after disasters leaves little time to plan for the programs and for future development. Therefore strategic planning for housing recovery entails planning with objectives and specific methods for implementation *before* the disaster strikes. This means knowing 1) the risk for certain areas of potential hazards; 2) what is the damage that might be incurred; 3) which families are most vulnerable.

Based on this information, it is possible to prepare and hopefully implement a plan at the strategic level to help reduce the risk of damage to the built environment before the disaster strikes and to plan what steps will be taken after the disaster to aid in recovery and reconstruction. Fox, Johnson and Lizarralde (2003) outline a framework for improving resilience in the built environment and for improving the practice of housing recovery after a disaster: The framework includes ten basic steps:

Before the disaster

1. Vulnerability assessment and risk mapping: Deciphering how communities are vulnerable to particular disasters.

2. Review of traditional and modern construction technologies: Optimizing the use of already well-adapted local housing solutions to help with the reactivation of the local economy.

3. Evaluation of coping mechanisms: Evaluations of the plans, relationships and resources that families, organisations and governments have to help them cope with a disaster or the threat of a disaster, such as: kin and social networks, community organisations, insurance policies, and evacuation procedures.

4. Education and training: Training and education programs must include the identification of areas of vulnerability, measures (social, physical and organizational) that can be employed to reduce vulnerability and awareness of plans developed to manage post-disaster reconstruction activities.

5. Strengthening of inter-organisational arrangements: Due to the complexity of the tasks required for community recovery, a single institution can rarely develop reconstruction projects. An inter-organizational system is therefore required to develop complementary –and parallel—tasks.

During or after the disaster

6. Needs assessment and damage evaluation: Assessment of whom and what have been affected and determination if people's basic needs are being met. Reconstruction and inter-institutional arrangements will need to be re-assessed to make sure they correspond to the particular disaster situation.

7. Development of community participation methods: Participation must be tailored to suit the local conditions and traditions of the community. A distinction can be drawn between systems where the

community is merely involved with the process and systems where the community participates with full decision-making powers.

8. Environmental monitoring: All too often the response to a disaster overlooks this fact and, as a result, reconstruction programs often lead to increased environmental degradation, increased vulnerability and a reduction in sustainable livelihoods.

After reconstruction

9. Performance evaluation: The analysis of the reconstruction programme or project, including different levels in time (inputs, outputs, results, objectives) is an efficient method to evaluate development initiatives embracing the evaluation of the strategy, the results and the impacts obtained.

10. Knowledge development and dissemination: It is important to guarantee that knowledge gained is knowledge applied. Informal discussions and conferences that link organisations, researchers and practitioners are extremely helpful for knowledge development and dissemination of evaluation results.

The multi-disciplinary and cross-sector nature of this framework points to the necessity of community-wide strategic planning. The ability to draw across networks is one of the main strengths of strategic planning for the public sector, according to Bryson and co-authors (1986):

> It provides a counter-balance for the tendency of the public sector to be organized into specific policy networks that cut vertically across general purpose governments at the federal, regional and local levels. Strategic planning provides governments with an opportunity to make connections and changes across programs—and therefore to make more of a whole out of disparate parts of public policies and programs (p. 66).

For disaster recovery and within the strategic planning paradigm, the ability to draw across government departments and to develop programs that include both the non-profit and public sector is a major factor in the success of a

program (Lewis 1999). As suggested by the framework outlined above, reconstruction programs do not only include building houses, but also programs for education, training, job creation, social networks, loans and other services.

2.3.2 Approaches, stages and strategies in post-disaster reconstruction

Comerio (1998) shows how governments in both developing and developed countries will respond differently to the need for new housing caused by a disaster. She identifies four different economic approaches to housing reconstruction after disasters:

1) *Complete redevelopment (including housing, infrastructure, and services) of devastated city by a national government.* This is most common in states with a centralized government, such as socialist states. The Chinese government used this approach after the Tangshan earthquake in 1976 and the Soviet government in Armenia in 1988.

2) *Infusion of outside aid targeted to low-income housing provided by governments or charities.* This is the most common approach in developing countries, where the government has little money to invest in reconstruction and household insurance is virtually non-existent. Outside expertise and money is brought in to help with development plans and reconstruction.

3) *Limited intervention approach, which assumes that private insurance will cover some losses, property prices will adjust to the new circumstance and government will provide some supplemental assistance for the poor.* This is most common in developed countries where losses to disasters have been less intense and outside aid for housing reconstruction is not needed since homeowners are protected through private insurance. Such was the case in Italy after the Friuli earthquake and in USA after various hurricanes and earthquakes. However, the approach assumes that private

insurance is available and affordable to all property owners and completely overlooks those people who are renters.

4) *A complete reliance on market forces to adjust and adapt after a disaster.* This is when the federal government or outside agencies will provide assistance to restore local infrastructure but individuals and property owners must cope with their own personal losses through their own financial resources. Has happened in Japan where there is little homeowner insurance, yet government has only funded public infrastructure.

Approach no. 2, infusion of outside aid has been the subject of the largest amount of research, that is, outside the insurance sectors. In the early years of this approach, reconstruction paid for and managed by foreign agencies was quick and large-scale Western-style construction was prevalent. This approach came under strong criticism by housing advocates and social scientists because of lack of consideration for local ways of life and local capacity building (Anderson and Woodrow, 1989; Aysan and Davis, 1992; Cuny, 1983; Oliver-Smith, 1990). It was established that there was a need for a link between reconstruction and economic development and that there needed to be careful evaluation of *what* is needed and *how* it is delivered. These opinions echoed the enabling approaches of the World Bank. Less intense intervention is now the accepted norm, infusions of outside cash are made to work with local communities in housing reconstruction partnerships. However, despite its obvious merits, the self-help approach to rebuilding after disasters has been difficult to fully implement because the need for immediate shelter, that is to say, the need for speed, is often overwhelming. What has evolved is a mix of methods whereby some houses are built using Western methods and some are produced locally, built through NGOs offering materials and training.

In disaster research the terms "housing" and "sheltering" are often used interchangeably, with little distinction between the terms, however, Quarantelli (1995) defines four stages which may pass through after a disaster:

1. Emergency sheltering
2. Temporary sheltering
3. Temporary housing
4. Permanent housing

The distinction between *housing* and *sheltering* is made on the basis that housing involves the resumption of household responsibilities and activities in the new living quarters, whereas during sheltering, normal daily activities are put on hold. Actual or potential populations seeking quarters outside of their own permanent homes for short periods utilize *emergency sheltering*. Emergency shelters are typically used for a few hours or possibly for a one-night stay. This does not require the provision or means for food preparation since the stay is so short. *Temporary sheltering* refers to the populations' temporary displacement into other quarters with an expected short stay. This could take the form of a tent, a second home, a family member's/friend's house, a motel, or a public facility where people will stay for more time than just the height of an emergency. There is no attempt to re-establish household routines; however, there must be an arrangement for food provision.

Temporary housing can take the form of tents, prefabricated housing, mobile homes or apartments. *Permanent housing* implies that the affected population returns to their repaired or rebuilt houses, or moving into new quarters in the community. In most disaster situations in developed countries there is a sharp distinction between temporary and permanent housing. However, in less developed countries this distinction can be blurred: what is initially intended as temporary housing can become permanent housing over the long-term if no formal permanent housing is constructed.

After the onset of a disaster, the affected population, governments, and relief agencies must choose from a range of shelter or housing possibilities. For the affected population, the decision may be based on immediate factors such as the current condition of their housing or amount of money they have to repair it. Government and relief agency policies for shelter provision or compensation may or may not influence this decision. For governments and relief agencies there is a range of options for programs and policies. Yet each option is not without its own set of benefits and drawbacks. Davis (1978) outlines three basic strategies about shelter following a disaster:

- Strategy 1: Housing survival
- Strategy 2: Filling the gap
- Strategy 3: Accelerated reconstruction

In Strategy 1 (housing survival), the existent housing survives the disaster so there is no need for temporary housing provision. This strategy is considered to be the ideal, where all housing is built to a structural standard that will survive any hazard. Strategy 2 (filling the gap) is required when normal housing is damaged or destroyed by a hazard, thus there is a gap in living accommodation caused by the destruction. This gap is filled by the provision of temporary shelter, and if the gap exists long enough, by the provision of temporary housing. Strategy 3 (accelerated reconstruction) negates the need for agency-provided temporary accommodation because the reconstruction is started in the very early stages after the disaster. Disaster victims can stay in tents, with family/friends, in hotels or in makeshift shelters. This strategy is considered to be better than Strategy 2 (filling the gap) because it minimizes the overall impact of the disaster on the affected population. However, it supposes that the reconstruction can really be accelerated, by some technical or organisational process.

UNDRO, like Davis, advocates accelerated reconstruction as the best shelter strategy since it accelerates full recovery and makes optimal use of local labour and material resources. "In the past, some agencies have undertaken a 1-2-3 strategy, i.e. they provide emergency shelter, temporary housing then permanent housing. Some agencies have taken the shorter but still costly routes of 1-3 or 2-3. These routes can be wasteful unless the materials and skills contributed in the first instance contribute significantly to the final stage of reconstruction" (United Nations 1982, 34).

Housing reconstruction can follow different methods, some of which are similar to the enabling methods of housing provision found in international development projects, such as core housing, or sites and services. Barakat (2003) outlines four methods for housing reconstruction:

1) Repairing damaged housing
2) Building new housing
3) 'Building yard' approach whereby communities do the rebuilding but outside agencies make the materials and skills available and affordable
4) Finance facilitation approach whereby communities do the rebuilding, with financial help from outside agencies.

Repairing damaged housing is often the quickest and least expensive approach if housing is not severely damaged. However, if new housing must be built, Barakat (2003) suggests that certain considerations must be taken into account, such as:

- *The choice of location and site selection*: This is a very time-consuming and sometimes politically difficult aspect of reconstruction. New housing can be built on sites that families choose or on land that they have inhabited before; in both scenarios, however legality of settlement and eventually purchasing land must be negotiated.

- *The choice of construction methods and materials:* The use of local materials, industries and construction knowledge is desirable and often disaster resistant building techniques can be incorporated into local methods. Generally, radically different methods of construction will not be incorporated past the initial project. Prefabricated housing can be quick to supply but often it does not last long enough and it can be culturally unsuitable and do little to promote the local economy.

- *The choice of design:* The most important factor is to start the design process with the local community and to use forms and room proportions that reflect the users needs'. When prototype houses are developed that are not locally adapted they may do little to address specific needs requirements, e.g. of rural families with the needs of their livestock or large families.

2.3.3 Project planning and management for reconstruction

Planning and managing projects or programmes in the post-disaster scenario pose extra challenges over and above those faced in the average project because of the chaos of the environment, the scarce supply of resources and the pressing need to get things accomplished as soon as possible. Lizarralde and co-authors (2003) outline some particular aspects of the post-disaster project environment:

- Extremely complex needs that require multiple products and services. Since a single institution can rarely provide these products and services, cooperation between various local, national and international organisations (with their varying objectives) is necessary.

- A highly competitive market of international funding where organisations must demonstrate their competence. Projects must fit within the ideologies or the criteria of funding bodies such as donor governments and international development agencies. For example the World Bank outlines that post-disaster housing projects must be

completed within two years of the disaster, putting pressure on implementing organisations to carry out projects within the time allotted (Gilbert, 2001).

- Turbulent political and economic contexts that may be difficult to predict or which pose problems for carrying out the work (Anderson and Woodrow, 1989).
- Funding resources are scarce and organisations may compete for access to finds to do projects.

To respond to these particularly difficult aspects of the environment, it is important to establish an inter-organisational design prior to the disaster. This means cataloguing the capacities of various organisations (local, regional, national or international) and setting out agreements for cooperation (Lizarralde, et al., 2003). This also includes having on board organisations that have direct relations with local communities; it is not important if these organisations are development or relief related, only that they have positive ties with the community they serve. Jigyasu (2002), Jayaraj (2002), and Sivaji (2002) show how in India, the pre-disaster relations of organisations with the local community contributed to the success of post-disaster projects.

There are a number of principle stakeholders involved in post-disaster housing projects—multiple levels of government, NGOs, community groups, affected families, building suppliers and contractors (Barakat, 2003). Since there are many projects occurring simultaneously, a coordinating agency, usually part of the government, is set up especially for the recovery and reconstruction period to manage all the activities and administer the government and multi-lateral donor budgets. Housing projects are planned and managed by various groups such as government (local, regional, national), international NGOs, or local NGOs, community groups and other civil society organisations; different groups will be acting at the same time on

different projects and there is often cooperation between these groups on any single project.

Post-disaster projects in relief and reconstruction can strengthen civil society organisations in a country, especially filling in gaps where governments fail. Ozerdem and Jacoby (2006) shows how in Turkey the failure of the government to respond to citizens' needs in the immediate aftermath of the disaster lead to the empowerment of civil groups who responded with many relief and housing reconstruction projects. Many of these groups have continued to retain power even once the reconstruction phase is over.

Once an organisation has decided that it will intervene in a disaster situation, it needs to understand what the greatest needs are and to match these needs with its capacities. An accurate post-disaster needs assessment is an important factor in this. Cuny (1983) discusses how organisations must clearly establish a framework for their policies, objectives and goals to guide their decisions as to which projects to get involved in and what approaches should be taken for the selected projects.

Contractors, self-building or some intermediate approach may be used for the actual construction. Barakat (2003) outlines some of the factors that can guide the decision as to who will undertake building:

- The scale and spread of destruction and the size of the settlement. The larger the project, the greater the likelihood of employing contractors.
- Building methods in the target region and the technical complexity of construction; the more complex the scheme, the more likelihood of employing contractors.
- Whether housing prior to the disaster was generally provided through self-help construction, and whether basic construction techniques are widely known.

- Capacities of the stakeholders (technical, economic, organisational), particularly when it comes to introducing mitigation measures.
- The amount of time and effort the target population is willing to invest in the reconstruction.
- The timeframe of the project.

Contractor built housing has the advantage that it can be implemented more quickly and the timeframe is easier to adhere to. Sometimes in the post-disaster situation, local contractors may be overly burdened therefore contractors must be brought in from afar.

It is generally understood that the greater the role the beneficiaries or affected families play in housing reconstruction projects, the more adapted the responses will be to the local situation. Also employing a local workforce and labour is better for stimulating the local economy and capacity building (Cuny, 1983). However, in practice, it appears that the roles that local communities play in reconstruction projects are more often focused on manual labour rather than decision-making roles—especially if the projects are instigated by international NGOs. If individual families are expected to make decisions regarding house design and contractors, they may need some support to guide them through this process (Davidson et al. 2006).

2.4 Temporary housing

Past research and experience have determined certain problems with the application of temporary housing schemes and consequently there are many who generally advise against it. Nonetheless, experiences show that there are specific situations that necessitate temporary housing:
- When the damage to housing is considerably widespread and there is an acute shortage of interim housing possibilities (Quarantelli, 1995, Comerio, 1998).

- To keep people from migrating away from the area (United Nations, 1982).

- When there are not enough resources to build permanent housing, especially right away (United Nations, 1982).

- When relief organisations want to show donors in the home countries that something is happening (Davis 1978). A house is a tangible product that can be photographed; people everywhere understand its importance as a basic necessity of life.

The following discussion offers some of the main drawbacks with temporary housing, organised around the following headings: cost, locations, land acquisition, demands for units, vacating housing, and social and cultural suitability.

Cost

Temporary housing is an expensive solution to housing shortages after a disaster. Obviously the dwellings range in price depending on the type of materials used, the quality, and the method of construction but the cost always mounts up to become a significant percentage of the cost of the typical permanent dwellings in a given area (United Nations, 1982). Temporary housing provided after the Iranian earthquakes in 1997 was reported to cost up to one-third the price of a normal dwelling (Ghafory-Ashtiany, 1999). The acquisition of land plus the provision of infrastructure and services add to the expense.

Often, it is argued that funds to build temporary housing would be of better use for the construction of permanent housing (Quarantelli 1995; United Nations 1982, Davis 1978). Western industrialized countries tend to make a sharp distinction between 'temporary' and 'permanent' housing, but this distinction cannot be applied with the same amount of regularity to all

countries, especially those were people are building and adding to their homes on an on-going basis (United Nations, 1982). In countries with a mild climate, a permanent dwelling can be built cheaper and more quickly than a prefabricated temporary house.

Locations

Temporary housing is located on the outskirts of urban areas, on vacant tracts of land within the city, in city squares or parks, or on private land next to damaged houses (Bologna, 2006; Johnson, 2000; Comerio, 1998; Cuny, 1983; Geipel 1982; Davis 1978). In many cases, agricultural land or untouched land is cleared to make way for tracts of temporary housing. This changes the patterns of development in the city. "Land invasions following earthquakes have effected the make-up of peripheral settlements around large cities and have, in many cases, affected the pattern of land ownership and tenure, not only in the immediate area of the invasion but also in surrounding communities" (Cuny 1982, 12)

The eventual outcome is that the city limits are extended in such a way that it leads to an increase in urban sprawl and the need for extended transportation and infrastructure systems. Using agricultural land for housing instead of its intended use pushes agricultural practices further into the hinterland thus forcing the consumption of previously untouched land (Cam, 2000).

Land acquisition

The easiest way to acquire land for temporary housing is to either locate it on public land, on public rights of way or to place the houses on the affected families' property, next to their damaged house (Comerio, 1998). Deciding on satisfactory locations for temporary housing tends to eat up lots of time after the disaster, especially when land must be acquired from private land holdings, either through a lease or by expropriation (Johnson, 2000;

Dandoulaki, 1992). In Greece, after the 1986 Kalamata City earthquakes, the procedure of land acquisition delayed the temporary housing program by several months. Since there were inadequacies in the pre-existing legislation for emergency situations, the municipality had to opt for alternative solutions to land expropriation, which involved leasing land from private landowners (Dandoulaki, 1992).

Land acquisition has proven to be simplified in countries where there is state ownership of the land. For example, after the 1963 earthquake in Skopje, Macedonia, the government procured farmland to make it available for the reconstruction. Displaced farmers had to make the best of the situation and take up work in the factories of Skopje (Davis, 1975).

Demands for units

The assessment of the needs of the affected population is always a difficult yet very important part of any relief program. At best, it involves extensive data collection and sophisticated collaboration between relief organizations and governments (Anderson and Woodrow, 1987; Cuny, 1983). Most commonly, programs tend to overestimate the required number of temporary units (Dandoulaki, 1992; United Nations, 1982; Davis, 1978). Delays in project completion mean that many families are without necessary accommodation for several months, during which time they often relocate to another region or find themselves adequate accommodation in the area (Dandoulaki, 1992; Geipel, 1982). Consequently, when the temporary housing units are completed, the families that were supposed to move into them no longer need them. Also, many families find a place to stay with friends or relatives and would prefer to stay there rather than move into a temporary housing unit (Bolin, 1982). The assessment of needs must be an ongoing process to monitor how many families are actually in need or want of housing at any given time (Cuny 1983). For example, this overestimation of

needs was found to be true after the Kalamata City earthquakes (Dandoulaki 1992).

Vacating temporary housing

In past cases of temporary housing provision, it has proven difficult to remove people from the temporary units when the time comes to dismantle the housing (United Nations 1982; Davis 1978; Cuny 1983; Quarantelli 1995; Chalinder 1998; Dandoulaki 1992). Even though the inhabitants have moved out and are occupying permanent housing, they use the temporary house for storage, for housing family members or friends, or as an income generating sublet (Dandoulaki, 1992; Geipel, 1991). In order for people to completely vacate the temporary housing, there must be ample affordable permanent housing available, thus the level of development must reach beyond the pre-earthquake conditions.

Governments may purchase temporary housing with the idea that it will be useful again at a later date. If it used by rural populations after a disaster, the units can be recycled for storage or used as outbuildings on the property (Ghafory-Ashtiany 1999). If the temporary units are situated in an urban environment, they can be dismantled and stored for future housing shortages. However, if the units are used for an extended period of time, most of them will not be in good enough condition for reuse, and parts needed for refurbishment can be difficult or expensive to obtain. Also, considering the expense of storing the units over what can become a long period of time, pending the next disaster, it may not be economical to reuse the units (Dandoulaki, 1992).

Social and cultural suitability

There is strong evidence to support the statement that temporary housing lacks social and cultural suitability (United Nations, 1982; Davis, 1978; Ghafory-Ashtiany, 1999; Dandoulaki, 1992, Aysan, 1984). The unit's size, shape, layout, the materials used, as well as the site conditions are factors in determining or limiting suitability. Length of tenure and types of alterations made to the dwellings are good measures of suitability. Most often, if the housing is drastically inappropriate, people will refuse to move into them or they will vacate them very quickly. Households will try to make the dwelling more liveable by adding rooms. In some extreme cases, temporary housing has been found to be detrimental to the rehabilitation of the population because its cramped conditions causes tension in families; since reconstruction generally takes longer when temporary housing is provided, families are forced live longer in unsatisfactory dwellings (Ghafory-Ashtiany, 1999).

Temporary units built after the 1975 earthquake in Lice, Turkey was found to be unsuitable culturally. Families objected to the two-room single storey box dwelling, as well as to the close grid-pattern layout of the settlements. In this case, if families had more participation in what was provided some of these problems could have been alleviated (United Nations, 1982).

The distinction between rural or urban situation is also a factor regarding suitability. In urban areas, temporary housing can be supplied with infrastructure and services that make the housing more acceptable. In rural areas, temporary housing has been found to be less acceptable because of family requirements; this is especially true when households have a practice of keeping farm animals in the house (Ghafory-Ashtiany, 1999; Aysan, 1984).

Due to the cultural and social limitations (as well as limited physical space) of temporary units, room for personalization and additions to the dwellings is imperative. Families who lack living or storage space are able to increase

their satisfaction if they can build additions to the house. Space for outdoor seating, a garden, or outbuilding on the plot reinforce personalization and definition of space (Ellis and Barakat, 1996; Aysan, 1984).

Planning for temporary housing

Temporary housing settlements, like any human settlement, are not just made up of houses, but also of the people who live in them. Therefore, as is implied in the discussion above, a temporary house has importance not just as a shelter from the elements but also as a shelter for social, spiritual and psychological needs. In order to respond to these needs, temporary housing needs to receive detailed holistic planning, looked at from a systems view, or it will continue to have negative effects on rehabilitation, reconstruction and development (Ellis and Barakat 1996)

Chalinder (1998) points out that focusing on human needs can be considered *planning for* temporary housing, while the engineering, planning of specific layouts, roads, blocks for shelters, water points and latrines are considered *planning of* temporary settlements. *Planning for* temporary settlements means examining whom the response is aimed at. Planning teams are needed that consist of land-use planners, socio-economists, health specialists, engineers, architects, sociologists, community service specialists and program managers.

Cuny (1983) points out that a crisis, such as that brought on by a disaster, can reinforce local coping mechanisms and can bring local organisations to function better than during normal periods. Collecting social and anthropological data can identify local coping mechanisms before or at the onset of a disaster. If aid programs ignore these local coping mechanisms they can disrupt the latter's ability to function properly and even damage them by undermining their credibility within the community. Aid that is intended to

help may actually be provided in such a way that it impedes recovery, causes economic hardship, and renders the society less able to cope with the next disaster.

The actual needs of the population can differ widely from the needs that the aid organisations perceive. For example, Ellis and Barakat (1996) found that a needs assessment of a displaced population in Croatia would have shown the overwhelming majority of refugees could be accommodated privately and that temporary settlements (which had already been provided) were not actually necessary. They also found that private accommodation would have been the *best-fit* solution since it would have been more culturally sensitive, socially acceptable, integrated, participatory and appropriate.

2.5 Conclusions

In order to look at the issues of strategic planning for temporary housing after disasters, this section on previous research has highlighted the major ideas in the subject of housing in developing countries, in disaster research and in post-disaster reconstruction. Issues of housing in developing countries explain that today's most favoured approach is to enable families to look after their own housing needs by allowing them access to land and financing systems. The study of disasters and the practice of disaster management is an expanding subject, in which vulnerability plays a key role to understanding how to reduce the impacts of natural hazards. Activities of preparedness and mitigation are essentially strategic planning activities that help communities to be more resilient to disasters.

The subject of post-disaster reconstruction is closely related to housing issues in developing countries because of the similar problems of financing, tenure, and need for community-based approaches. However, in post-disaster reconstruction, and especially in temporary housing, the need for a

speedy recovery complicates matters further, putting more pressure on governments and outside agencies to react quickly.

Previous research about temporary housing provides a wealth of information about the many issues in temporary housing. However, it is found that most of the literature compartmentalises the steps of temporary housing and permanent housing into separate programmes because, in reality, these programmes are often run by completely different agencies. A temporary housing programme can imply different things; it can mean the physical supply of a temporary house, the financial support and aid to help find an existing house to live in temporarily or a combination of these solutions. To move beyond an analysis of temporary housing that views temporary housing programmes as essentially either 'bad' or 'good', we need to examine the problem of temporary housing through a system's approach, which sees temporary housing as a part of the whole system of post-disaster recovery (System, 2006) defines a system as a group of interdependent parts. These parts are generally systems themselves and are composed of other parts, just as systems are generally parts or components of other systems. The system of post-disaster recovery includes all the stages of housing, infrastructure and community repairs plus all services that are available to families. Therefore, the research presented in the following chapters comes from the perspective that the way to offer a better understanding of temporary housing is through systems thinking. A detailed explanation of the systems addressed is offered in section 3.3.1 of Chapter 3, Methods.

CHAPTER 3: METHODS

3.1 Case study method

The overarching methodological approach adopted for this research is the case study method looking at the bounded system of a temporary housing programme after a disaster. According to Creswell (1998) a case is an exploration of a 'bounded system'—bounded by place and time—that studies a programme, event, activity or individuals.

The case study method can be both qualitative and quantitative; it is a comprehensive research strategy including research design, data collection techniques and approaches to data analysis. Yin (2003) describes a research design as a 'blueprint' of the research that deals with: 1) what questions to study 2) what data are relevant 3) what data to collect 4) how to analyse the results. The following section will outline the research design of the doctoral work including subsections detailing the methods applied for each of the four articles, the methods of data collection used and the approaches to data analysis.

There are four common commitments in case study research: to bring expert knowledge to bear upon the phenomena studied, to round up all the relevant data, to examine rival interpretations, and to ponder and probe the degree to which the findings have implications elsewhere (Yin, 1994). The case study method is useful when the research seeks to understand complex social phenomena or a set of events over which the investigator has little or no control. The case study method is most often employed to illuminate a decision or set of decisions to understand why they were taken, how they were implemented and with what result (Yin 2003). It can also be useful to study an organisation, a process, a programme or an event.

Yin (2003) offers a technical definition of a case study:

"A case study is an empirical inquiry that:

- Investigates a contemporary phenomenon within its real life context, especially when
- The boundaries between the phenomenon and the context are not clearly evident

The case study inquiry

- Copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result,
- Benefits from the prior development of theoretical propositions to guide data collection and analysis" (p.13).

3.1.1 Research design

Research design deals with logical problems, rather than logistical ones; the goal is to match rational research questions with the right evidence that will allow the researcher to draw analytical generalisations—that is generalizations to the theoretical propositions rather than to populations or universes (Yin, 2003).

Case studies can either be intrinsic or instrumental in type; 'intrinsic' case studies focus on the case because of its uniqueness or to have a better understanding of that particular case, whereas an 'instrumental' case study is examined mainly to provide insight into an issue and to draw out generalisations about that issue (Stake 2005; 1995). This research uses an instrumental type of case study to build a better understanding of temporary housing programmes after disasters. The main case, along with the other cases, is used to generalise about the major issues in temporary housing programmes.

Case study research usually starts with 'how' or 'why' questions about a set of events. The *research questions* posed in this research are:

1. Why do temporary housing programmes continually suffer from recurring problems (such as being overly expensive in relation to their lifespan, unplanned permanence, late delivery, unsuitable designs for the climate, culture and family size, or unsuitable locations)?
2. What must be understood in the process of temporary housing to lead to innovation as to how to improve temporary housing programmes?
3. How could strategic planning address these recurring problems in temporary housing programmes?

Based on these research questions, a number of *theoretical propositions* are established to guide the research design:

1. Temporary housing programmes continue to suffer from the above-mentioned recurring problems because, in the post-disaster situation, decisions about temporary housing must be made very quickly, leaving little time to plan and assess various strategies.
2. Organisational and technical systems for temporary housing programmes differ from country to country and can impact on the outcomes of the programmes.
3. Pre-disaster strategic planning for temporary housing needs to account for organisational arrangements, availability of land and suitability of designs.
4. Temporary housing programmes can reduce costs and unwanted permanence by planning for later productive use of the units/materials.

These theoretical propositions, or theory developments, are informed by the review of literature and form the basis of the research, and are used to define the specific subjects for research included in this dissertation.

Yin (2003) explains how the case study method is constructed. As shown in figure 4, theory development forms the basis for selecting the cases and for the design of the data collection protocol. The case studies are conducted (which may re-inform the theory) and the case reports are written individually before drawing cross-case conclusions. These conclusions then lead to the modification of the theory, or what Yin describes as analytical generalizations, which, as has been stated, means that generalisations are made to theory rather than to populations or universes.
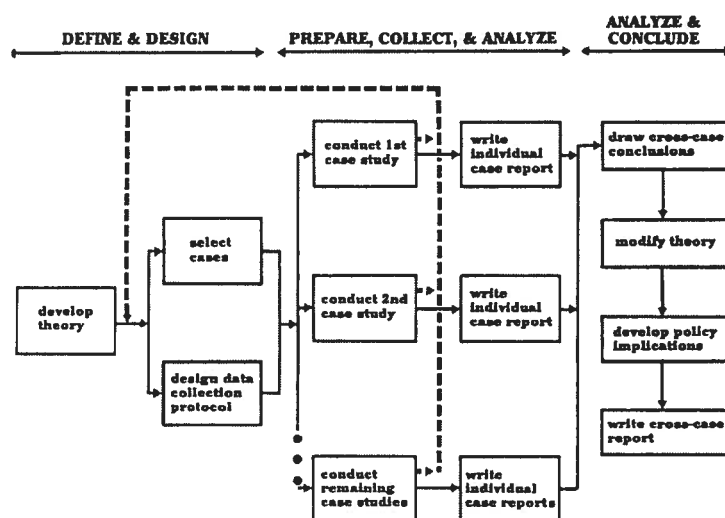
Figure 4 The case study method (source: Yin, 2003, p. 50)

The case study method defined by Yin, above, is complimented by Stake's (2005) discussion on theory development, or as he calls it, 'issue evolution.' This includes: 1) defining the *topical issue* of the research, 2) posing *foreshadowed problems* that concentrate on issue-related observations, 3) stating issues under development that the research will focus on, and 4) once the research has been completed, defining the assertions.

Figure 5 is a sketch of the method used in this research and combines both Stake's ideas of issue evolution and Yin's case study method. The topical issue, planning for post disaster temporary housing, emerged out of research

conducted at the Master's level, which included a study of the different temporary housing projects built after the 1999 earthquakes in Turkey (Johnson, 2000). This research, conducted ten months after the earthquakes, found that many people had been temporarily housed in settlements on the outskirts of cities, which resembled new suburbs containing many services and amenities. The question remained, however, what would become of these settlements after people had settled in permanent housing? Was this money well-spent? How could this process be improved?

TOPICAL ISSUE
Planning for post-disaster temporary housing

SELECTION OF PRIMARY CASE STUDY
1999 Turkish Earthquakes

THEORY DEVELOPMENT

DESK RESEARCH OF CASE STUDIES
1999 Turkey
1995 kobe Japan
various USA
1985 Mexico
1986 Greece
1976 Italy..

ISSUE UNDER DEVELOPMENT
1. What different forms does temporary housing take?

CASE REPORT
Types of temporary housing used in Turkey

ARTICLE 1
"Types of Temporary Accommodation after Disasters"

FORESHADOWED PROBLEM :
Temporary housing suffers from many negative aspects however it is necessary after largescale disasters.

ISSUE UNDER DEVELOPMENT
2. What are the main problems with temporary housing? How can these problems be addressed?

CASE REPORTS

CROSS CASE CONCLUSIONS

ARTICLE 2
"Strategic Planning for Post-disaster Temporary Housing"

ISSUE UNDER DEVELOPMENT
3. How are different organisational and technical systems implemented in temporary housing projects?

ISSUE UNDER DEVELOPMENT
4. What are the long-term outcomes of temporary housing? How can these outcomes be made positive for the stakeholders?

DESIGN OF DATA COLLECTION/ ANALYSIS PROTOCOL

CASE STUDY DATA COLLECTION
1999 earthquakes in Turkey, temporary housing 'programme' and 'project' information

CASE REPORT
'Organisational design' of temporary housing programme in Colombia'
(BY GONZALO LIZARRALDE)

CASE REPORT
'Organisational design' of temporary housing programme in Turkey

CASE REPORTS
'Long-term outcomes' of four temporary housing projects in Turkey

CROSS CASE CONCLUSIONS

CROSS EMBEDDED-UNIT CONCLUSIONS

ARTICLE 3
"A systems View of Temporary Housing Projects in Post Disaster Reconstruction"

ARTICLE 4
"Impacts of Prefabricated Temporary Housing after Disasters: 1999 Earthquakes in Turkey"

ASSERTIONS AND CROSS ISSUE THEORY MODIFICATIONS

Figure 5 Sketch of the research design

3.1.2 Case selection

The case study selected for this doctoral research is the aftermath of the 1999 earthquakes in Turkey. Stake (2005) writes about the rational for choosing case studies, stating, "The researcher examines various interests in

the phenomenon, selecting a case of some typicality but leaning toward those cases that seem to offer the *opportunity to learn*. My choice would be to choose that case from which we feel we can learn the most" (p. 451). The case study of the 1999 earthquakes in Turkey was selected because:

1)   Over 40,000 units of temporary housing were built in the region, costing upwards of US$122 million. Therefore, the phenomenon occurred on great numbers, offering good possibilities for research;

2)   The Turkish government has a wealth of experience in building temporary housing after disasters, yet there appeared be many criticisms of its approach. Understanding areas for improvement could be helpful to the country, as this will most likely not be last programme for temporary housing in Turkey;

3)   There was a large presence of international and local NGOs building temporary housing, which allowed learning about both government and NGO practices.

4)   The earthquake happened recently enough that is was possible to observe the morphology of the temporary housing programme.

5)   Since the author had completed prior research in Turkey, it was possible to draw on this earlier data for a more complete understanding of the programme.

3.1.3 Theory development

Based on prior knowledge of the Turkish earthquake and on desk research of other cases of temporary housing programmes in different countries an *issue under development* emerged: *Temporary housing has many different forms, which need to be clearly defined. What are the different physical forms of temporary housing?*

A *foreshadowed problem* also emerged: The construction of temporary housing is systematically criticised as being problematic and ultimately

experts suggest that it should be avoided. However, it was noticed that temporary housing was supplied after every large-scale disaster, by governments or NGOs who were most probably responding to a dire need for interim housing.

From this, came another *issue under development: What are the main problems with temporary housing and how can these problems be addressed through planning?* The above two issues under development became the basis for the Article 1 and Article 2. The inferences drawn from the foreshadowed problem and these two articles lead to the development of two more specific issues under development. It was suspected that the organisational structures implementing temporary housing were very different in different countries, and that the types of temporary housing built would change depending on a country's economy and culture of building. The question posed was: *How are different organisational and technical systems implemented in temporary housing projects?* As well, it has been pointed out in previous literature that temporary housing projects tend to become permanent, an unwanted by-product of the programme. To address this issue, the next question posed was: *What are the long-term outcomes of temporary housing and how can these outcomes be made more positive for the stakeholders?* After following the case study method of data collection and case reports, these two issues under development became the basis for Article 3 and Article 4.

3.1.4 Design of case studies

Case studies can either be designed using a *single case* or using two or more cases, which is then called *multiple or collective case study* (Yin, 2003; Stake 2005). Cases can also have a *holistic design*, which means the study examines the global nature of a programme or it can have an *embedded design*, meaning that the case looks at elements within the programme, or at

selected projects that comprise the larger programme. Figure 6 is a matrix showing Yin's (2005) basic types of designs for case studies.
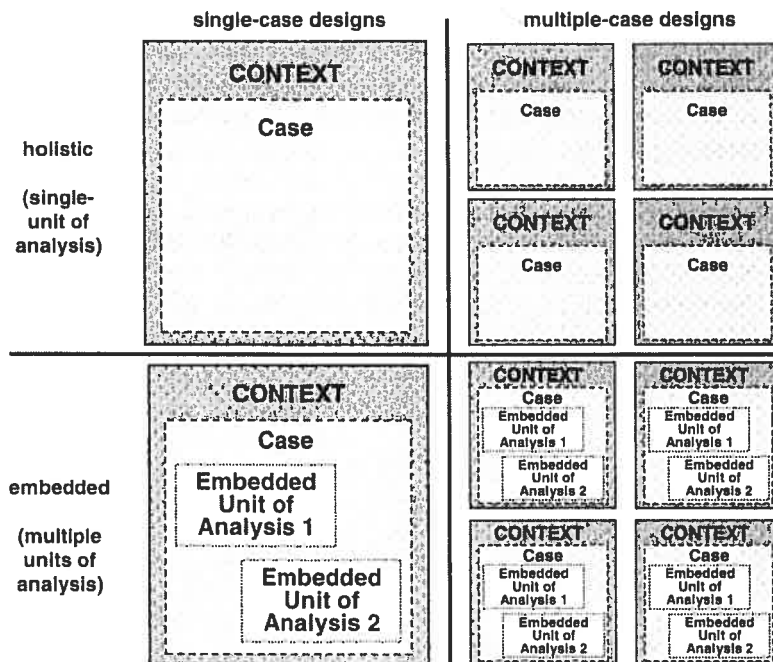
Figure 6 Basic types of designs for case studies (source: Yin, 2003, p.40)

Figure 7 outlines the types of case study designs used for each article included in this dissertation; as is apparent from the figure, this research employs single and multiple case studies as well as holistic and embedded units of analysis, as most appropriate on each instance.

The scope of the *overall research* described in this dissertation is focussed on the single-case design/holistic unit of analysis of the temporary housing programme in Turkey after the 1999 earthquakes. It looks at the entire programme including, among others, the different stakeholders involved, the physical houses, the cities it was located in, and its place within the overall reconstruction programme.

Article 1: Types of post-disaster temporary housing, also employs a single case design/holistic unit of analysis, describing the different types of temporary housing used in Turkey after the 1999 earthquakes.

Article 2: Strategic planning for temporary housing uses a multiple case design/holistic unit of analysis as it examines elements of six cases of temporary housing programmes in different countries.

Article 3: Organisational design of temporary housing is also a multiple case design/holistic unit of analysis looking at the temporary housing programme in Turkey as well as the temporary housing programme in Colombia after the 1999 earthquake.

Article 4: Outcomes of temporary housing projects is a single case design however it uses embedded or multiple units of analysis. The overall programme of temporary housing is examined for its outcomes, and as well four different temporary housing projects are studies, which are part of the larger programme.

OVERALL RESEARCH

Single-case Design/
Holistic (single unit of analysis)

TURKEY 1999 EARTHQUAKES
- Temporary housing programme
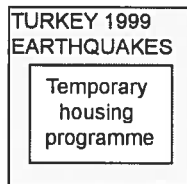
ARTICLE 1:
Types of Temporary Housing

Single-case Design/
Holistic (single unit of analysis)

TURKEY 1999 EARTHQUAKES
- Temporary housing programme

ARTICLE 2:
Strategic Planning
for Temporary Houisng

Multiple-case Design/
Holistic (single unit of analysis)

TURKEY 1999 EARTHQUAKES — Temporary housing programme
COLOMBIA 1999 EARTHQUAKE — Temporary housing programme
JAPAN 1995 EARTHQUAKE — Temporary housing programme
GREECE 1986 EARTHQUAKE — Temporary housing programme
MEXICO 1985 EARTHQUAKE — Temporary housing programme
ITALY 1976 EARTHQUAKE — Temporary housing programme

ARTICLE 3:
Organisational Design
of Temporary Housing

Multiple-case Design/
Holistic (single unit of analysis)

TURKEY 1999 EARTHQUAKES — Temporary housing programme
COLOMBIA 1999 EARTHQUAKE — Temporary housing programme
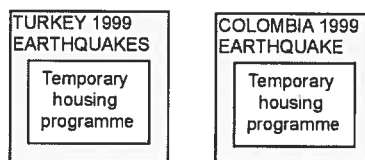
ARTICLE 4:
Outcomes of Temporary
Housing Projects

Single-case Design/
Embedded (multiple units of analysis)

TURKEY 1999 EARTHQUAKES
Temporary Housing Programme
- project
- project
- project
- project
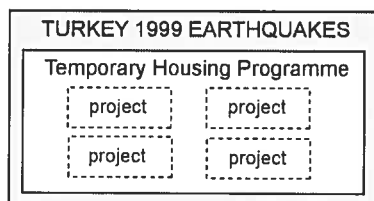
Figure 7 Case study designs of the overall research and the four articles

3.2 Data collection

Based on the research questions and theoretical propositions, which were outlined in the section above, operational questions were created to bring to light the data to be collected.

Multiple sources of evidence, obtained during field visits to Turkey, form the backbone of the data collection procedures for the research. Three different

sources of evidence: documents, interviews and direct observations allowed triangulation of the data, which is important to address issues of construct validity (Yin, 2003; Patton, 1987).

As defined by Yin (2003), a database of information is important to organise and document the case study. The database created for this research included MSExcel® forms with information, typed case study notes and transcripts of interviews.

3.2.1 Field visits

Data collection occurred over three separate field visits to Turkey after the August and November 1999 earthquakes. During each field visit I was based in Istanbul and made multiple trips to the affected region for a few days at a time. This allowed me to collect data and then, in Istanbul, to sort through the information obtained before heading back to the field. The first visit was for three weeks in May-June 2000, where I volunteered with a local NGO, Human Settlements Association, helping them to evaluate the different temporary house designs employed in the region. The second visit was for five weeks in November 2003, approximately four years after the disaster, when I collected documents, made contacts and visited several temporary housing projects in the region. The third visit was four months from May to August 2004, during which time I conducted interviews in Istanbul and Ankara, made numerous trips to affected towns to observe the temporary housing projects and to interview people, and collected many documents. In August of that year, I also worked with a team of other Turkish and foreign student researchers to collect information on the temporary housing projects in Düzce City.

3.2.2 Sources of evidence

<u>Documents</u> included government publications, scientific articles, theses, and other data. Government publications obtained from the municipality of Düzce included master plans of the urban area before and after the disaster, plans of the temporary housing projects and photographs of the construction process. From the General Directorate of Disaster Affairs in Ankara I obtained a document about the reconstruction policies and the Auditor General's evaluation of the reconstruction processes. Also helpful were two documents published by the World Bank for the Marmara Earthquake Emergency Rehabilitation Program (MEER). Documents also included two recently completed theses, articles published by Professor Polat Gülkan, as well as survey data provided by a group of student researchers. Many of the documents were available in English, but two important documents were only available in Turkish. With the help of Turkish friends, we translated these documents into English for the purposes of this research.

<u>Interviews</u> with stakeholders were guided by questions prepared in advance of the interview, however the discussions were generally open-ended and there were many extra questions posed and tangents followed where possible. Interviews were either conducted directly by me in English or were conducted through the help of a translator. All interviews were tape recorded and later transcribed and translated if necessary.

Interviews were conducted with:
- Residents in permanent and temporary housing = 11 interviews
- Government officials from the Ministry in Ankara = 3 interviews
- Municipal authorities in Düzce City = 2 interviews
- Local community leaders (muhtars) = 6 interviews
- NGO representatives = 3 interviews

In order to triangulate data with respect to the temporary housing process, interviews posed the same questions to different people.

Direct Observations were obtained from visits to the temporary housing and permanent housing settlements, and also more informally from spending time in the towns and communities. Annex 1 contains a list of the temporary housing settlements I visited. In each temporary housing settlement, I photographed the site, noted information about the type of housing, condition of houses and site, location, services, size of settlement and name of sponsoring organisation. In most cases I spoke with a few residents asking them about their experiences in the houses, if they lived there since the earthquake, how they got around and their future plans for housing. I often visited a home at each site and was invited for tea numerous times. If possible, I interviewed the muhtar (community leader), sometimes only informally, asking him questions about who was living on the site (affected families or new families), about management of the site and future plans for the settlement. I also visited the storage and refurbishment facility for temporary housing at the Ministry of Public Works and Settlements in Ankara where the government used to manufacture temporary housing. Annex 2 contains photos of this facility.

3.3 Data analysis

Procedures for analysing the data followed three different kinds of analysis generally used in qualitative-type case studies: systems thinking, typology building, and logical framework approach. The systems thinking approach is used in all of the research, while typology building is employed in article 1 and logical framework is explicitly used in article 4. The following section will outline the details of each of these data analysis methods.

3.3.1 Systems thinking

Systems thinking is employed throughout the research as a general approach to the problem of temporary housing after disasters. In recent years, the field of systems thinking has been developed to provide techniques for studying systems in holistic ways to supplement more traditional methods of science. In systems thinking, we gain insights into the whole by understanding the linkages and interactions between the elements that comprise the whole system. We see a subject as a series of conceptual systems and from multiple viewpoints.

Systems thinking sees all human activity systems as open systems, therefore the environment within which they exist affects them and vice versa. The heart of a system is interaction between a number of systemic elements separated from an external environment by some boundary. A system is typically linked to its external environment by a number of inputs and outputs (Olsson and Sjöstedt, 2004). Hall (1962) defines a system as: a group of elements with relations between them, and relations between them and their environment. He states that the environment of a system is: a) all the elements outside the system that affect the system when they are changed and b) affected by a change in the system. Wikipedia (System, 2006) defines a system as: any set (group) of interdependent parts; parts are generally systems themselves and are composed of other parts, just as systems are generally parts or components of other systems.

This research examines two kinds of systems that can be observed in temporary housing. The first system is at the level of the *programme* for temporary housing. Any programme for temporary housing occurs within the larger system of the reconstruction programme (of which it is, therefore, a sub-system) and is accompanied by other sub-systems such as the permanent housing programme or the emergency shelter programme (see

figure 8). The reconstruction programme exits within an even larger system of the overall recovery programme, which also exists within the economic, political and cultural systems of the country in question. Each of these systems will have an impact on other systems, i.e. the programme for job creation in a certain area will have an impact on the success of a housing programme—if there are no jobs available in the area, no one will move there.
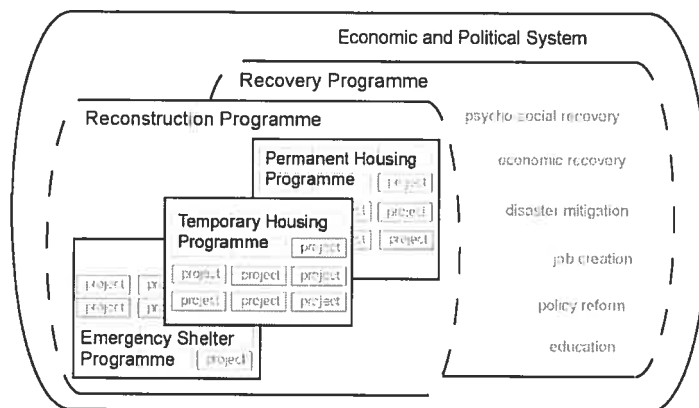
Figure 8 The temporary housing programme is a system that is interdependent with other programmes

The second system is at the level of the temporary housing *project*. Each temporary housing project is a result of the marriage between subsystems of the project that are interrelated: organisational design, the project process and the technical design of the unit (Figure 9). In the examination of a temporary housing project, this research looks at each of these systems and the interdependence between them.

SYSTEM OF A PROJECT
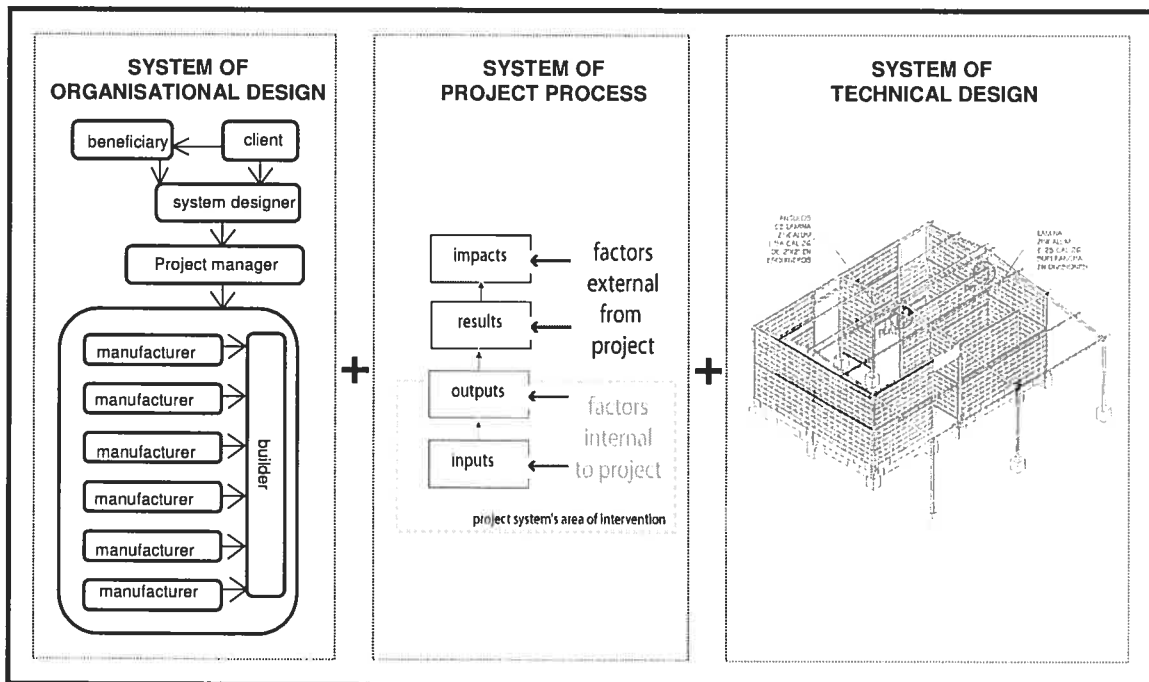
Figure 9 The system of a temporary housing project is made up of systems of organisational design, project process and technical design.

3.3.2 Typology building

The primary purpose of typologies is to describe a subject. Typologies are a kind of classification system; a way to create categories by dividing some aspect of the world into parts (Patton, 1980). Richardson (1990) explains that the purpose of a typology is not the creation of an exhaustive classificatory scheme but rather to:

(a) Find something in your material noteworthy of classification, and

(b) To provide some of the categories.

To develop category systems, Patton (1980) advises looking for *patterns of convergence*, that is, continuing regularities in the data. Patterns of *internal homogeneity* can de defined as the extent to which the data that belong in a certain category hold together. Also patterns of *external heterogeneity* can be

found which show the extent to which differences among the categories are bold and clear.

Article I on Types of Temporary Accommodation builds a typology of temporary housing based primarily on the Turkish case study. When doing the initial exploratory study in Turkey in 2000, I noticed families occupying many different kinds of structures that Quarantelli (1995) defines as the 'temporary housing' stage: shelters families built themselves next to the roadway; rather sturdy prefabricated structures with full kitchens bathrooms and bedrooms; small shacks offered by NGOs and aid organisations, and many different variations of these. The study examined the different materials, construction methods and suppliers of the houses to define categories of temporary housing. To represent the typology more thoroughly, the research also included some types that were not observed in Turkey, but have been observed elsewhere.

The information from this study was used to inform later parts of the study (as was described above in the research design. This follows Patton's (1980) suggestions that 'Typologies can later be used to make interpretations about the nature of a program, but the first purpose is description based on an analysis of the patterns that appear in the data" (p. 311).

3.3.3 Logical framework approach and impact evaluation

The logical framework approach, initially introduced to the international development sector in 1969 by USAID, is a useful tool for analyzing the performance of development projects. It employs a matrix of indicators to draw cause-effect relationships between different stages of the projects. The stages into which a project is subdivided have received different names and interpretations. However, as a constant, the logical framework considers at least four or five stages placed in a time-sequence of cause-effect:

i.   In the first stage, which is usually called *inputs*, the resources, and/or the activities that exploit the resources are considered.

ii.   The second stage, which is usually called *outputs*, includes the results of those activities; it involves describing the products and services delivered, taking into account the consumption of resources.

iii.   In the third stage, intermediate *results* are explained. Those results correspond to the immediate effects of the products and services offered; their effects can be measured as the transfer of technology—this stage is usually called *results* or outcomes.

iv.   In the fourth stage, the long-term effects are explained. This usually corresponds to the final goal of the project. In some cases, an intermediate stage can be considered to distinguish between the medium-term objectives and the long-term effects or *impacts*.

In addition to measuring the variables that are directly implicated in the project, it is necessary to include environmental factors that may influence the project—even if they are not directly related to the project. Aubry (1994) distinguishes between two kinds of environmental factors: 'internal factors' within the project and 'external factors' those that happen outside the influence of the project (see figure 10). Wiggins and Shields (1995) make reference to 'important assumptions', which are defined as "conditions which could affect the progress or success of the project but over which the project manager has no control." Such factors could be an economic downturn, or a political event, which affects the project but which the project can do little to control.
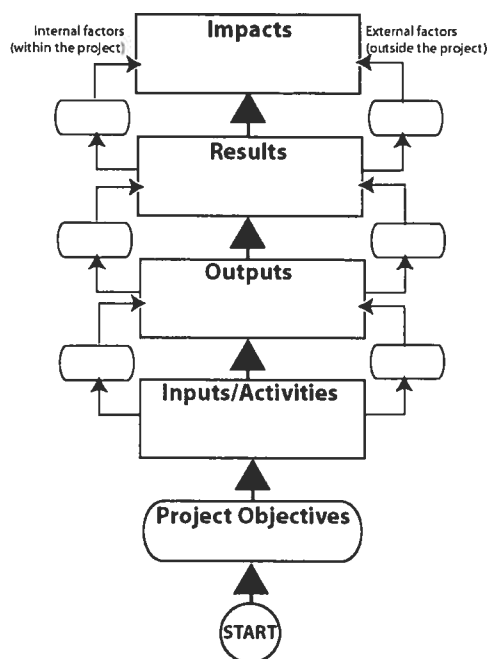
Figure 10 The classic logical framework including internal and external factors.

One of the criticisms of the logical framework is its tendency to draw attention only to whether expected impacts of the project where achieved or not, and therefore ignore any unexpected impacts of the project (Gasper 2000). Unexpected or unforeseen impacts, which are not previously described as indicators in the project, do not become part of the model at all. Therefore, for research that is focused on the impacts of projects, it is necessary to look to another type of evaluation method, that of impact evaluation.

Impact evaluation is the systematic identification of the effects—positive or negative, intended or not—on individuals, households, institutions and the environment caused by a given development project. Impact evaluation helps to better understand the extent to which activities actually reach and help beneficiaries. Cracknell (2000) and Baker (2000) explain that it is useful for:

i.   Measuring outcomes and impacts of an activity and distinguishing these from the influence of other, external factors;

ii.   Helping to clarify whether the costs of an activity are justified; informing decisions on whether to expand, modify of eliminate projects, programs or policies;

iii.   Designing lessons for improving the design and management of future activities.

Impact evaluation is not only concerned with the project's effects on participants but also how the construction of new housing impacts on urban management, on operating budgets, on the rental housing market and so on. Indeed, one of the key functions of impact studies is to throw light on unexpected impacts that were not foreseen in the project appraisal, so they can be taken into account more effectively in future projects.

The World Bank (1993a) suggests four steps for an impact evaluation:

1. Identification: noting whatever changes and impacts have taken place that can be attributed to the project. The impacts may be:

    i. Intended;

    ii. Associated, i.e. linked in some way to the project, but only indirectly—these are often unintended impacts;

    iii. Accessory i.e. impacts for which the project was only partly responsible;

    iv. Unrelated i.e. no obvious link with the project is apparent, but one needs to check.

2. Measurement: Trying to quantify or assess the significance of the impacts.

3. Attribution: Trying to establish the causes of the changes, especially the extent to which they can be attributed to the project. The logical framework can help to establish the cause—effect sequence of attribution.

4. Assessment: drawing together all the threads, and forming a judgement on the impacts in relation to the aid input. Making recommendations for future projects of a similar kind.

In order to look at the impacts of the temporary housing projects, the subject of Article IV, a method of analysis was defined to bring together the analysis of the project process used in the logical framework with an analysis of the impacts, as defined in impact evaluation (figure 11). This method constructs the logical framework from the top-down −looking first at the long-term impacts of the projects and comparing them to the project objectives. Then the short-term results are traced back, as well as the project outputs and inputs/activities to understand the project process. Through this, the analysis is able to pinpoint the factors internal to the project that affect the impacts as well as those that are external to the project.
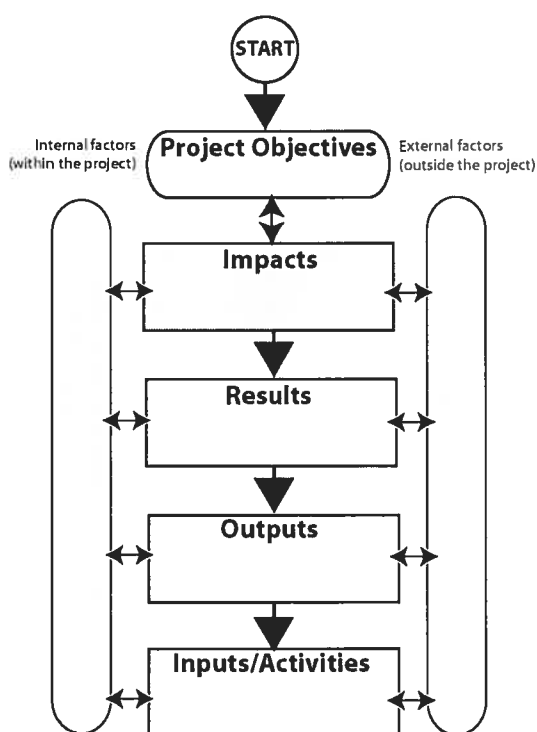
Figure 11 Logical framework modified for evaluating the impacts of temporary housing projects.

3.4 Summary

In summary, this research adopts a case study methodology to look at the problem of temporary housing after disasters. The case study of the 1999 earthquakes in Turkey provides evidence for understanding some of the major issues in the temporary housing which are, in turn, explored in the four articles presented in this dissertation; namely: types of temporary housing, and strategic planning, organisational design and long-term impacts for temporary housing programmes and projects. Data collection occurred during field visits to Turkey and consisted of interviews, observations and documents.

The approach to data analysis varied from article to article depending on the issues explored and the methodological approach used for analysing the different issues is reported in each article.

CHAPTER 4: ARTICLES

This chapter is comprised of four articles, which correspond to four separate subjects covered in the research: I) physical types of temporary housing, II) strategic planning for temporary housing, III) organisational design for temporary housing, and IV) outcomes of temporary housing projects. Each article has been published or accepted for publication; Article I, as a conference paper and Articles II, III and IV in refereed journals. Each of the journals has given permission to reprint the papers here; these permissions are found in Appendix C. To conform to the thesis requirements, the figures throughout the thesis are numbered sequentially, however in the published form of the papers, the figures are numbered separately for each paper. Also, the references are listed only at the end of the thesis.

Article I: Physical types of temporary housing

Johnson, C. (2002). "What's the big deal about temporary housing? Types of temporary accommodation after disasters: An example of the 1999 Turkish earthquake." In *Proceedings from the International Emergency Management Society (TIEMS) conference: Facing the Realities of the Third Millennium, University of Waterloo, Waterloo, Canada, May 14-17, 2002.*

Article II: Strategic planning

Johnson, C. (forthcoming). "Strategic planning for post-disaster temporary housing." (Accepted October, 2006 for publication in *Disasters*).

Article III: Organisational design

Johnson, C., Lizarralde, G., and Davidson, C.H. (2006). "A systems view of temporary housing projects in post-disaster reconstruction." Construction Management and Economics 24(2): 376-378.

Article IV: Outcomes of temporary housing projects

Johnson, C. (2006) "Impacts of temporary prefabricated housing after disasters: 1999 earthquakes in Turkey." *Habitat International* (In press, corrected proof online 05 June 2006 doi:10.1016/j.habitatint.2006.03.002*).*

Article I: Physical types of temporary housing

What's the big deal about temporary housing? Types of temporary accommodation after disasters: An example of the 1999 Turkish earthquake[1]

ABSTRACT

In this paper the author describes nine types of temporary accommodation that are commonly used after disasters. This description includes: the physical characteristics of each type, its effect on family recovery, and its function in the reconstruction continuum. Information is drawn from the author's field research in Turkey after the 1999 earthquakes in the Marmara and Bolu regions, as well as from other published case studies. Temporary accommodation refers to lodging provided for, or built by, the affected population as a place to stay in the interim between the immediate relief phase and the later reconstruction phase. It serves as a safe, private place where the family can begin to recover and go about their daily activities sooner, rather than later, after the disaster. This paper emphasizes how different types of temporary accommodation can be the best-fit option, depending on the particularities of the specific disaster and the timeline for permanent reconstruction.

INTRODUCTION: FILLING THE GAP

In 2001, 256 million people were affected by disasters, well above the previous decade's average of 211 million people per year. While the number of deaths attributed to disasters has decreased in the last twenty years, the number of people *affected* by disasters has increased quite substantially.

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[1] Published in *Proceedings from the International Emergency Management Society (TIEMS) conference: Facing the Realities of the Third Millennium, University of Waterloo, Waterloo, Canada, May 14-17, 2002.*

Relief and reconstruction for these populations after disaster is an on-going concern of many governments, non-governmental organisations (NGOs) and international agencies. However, the Red Cross World Disaster Report (2001) points out the need for research into managing the 'gap' in time that exists between the relief period and the reconstruction: "There is gap: the relief stops...often a year or more goes by between the disaster and [the start of] reconstruction. People can't wait that long...they begin rebuilding their lives hours after disaster strikes. They aren't interested in relief—they are interested in recovering. That is when people need technical assistance to reduce future risk" (IFRC, 2001). Technical assistance is a complex process that includes, among others, financial aid or incentives, mobilization of resources, social programs and physical construction.

One of the key aspects to filling this gap is finding a suitable lodging solution that allows the affected population to begin rebuilding their lives and to do so quickly. There are many types of *temporary accommodation* that can be implemented after a disaster to fill the housing gap between the immediate relief phase and the results of the permanent reconstruction. Types of temporary accommodation include, but are not limited to, tents, prefabricated temporary housing, shelters in public facilities, homes of family or friends, self-built shelters, or rented apartments. Usually several types of temporary accommodation are used concurrently to fill the housing need of the entire affected population. In some cases, temporary accommodation can be used as an effective housing solution not just to fill the gap, but can continue to be used through more than one phase of the post-disaster rehabilitation process.

Each type of temporary accommodation has its own set of short-term and long-term implications, and some types are more suitable than others, depending on the particular disaster situation. Therefore, the decision to implement a particular temporary accommodation strategy or strategies must

be based on knowledge of the short-term and long-term implications of each and an understanding of the particular characteristics of the disaster situation.

After a disaster, families are in need of a place to live, a place to restart, a place to take responsibility for what they have, a place to regain control over their lives for their economic, physical and emotional well-being. If temporary accommodation does not promote this process of reestablishment at the household level, it can hinder the overall recovery of the population and of the region as a whole. It is for this reason that temporary accommodation, and the chosen type of accommodation, is of particular concern after a disaster. In fact, temporary accommodation is inevitably an integral part of a family's recovery process after a disaster, and the type and availability of temporary accommodation can contribute to or hinder the recovery process.

The temporary accommodation used after the devastating 1999 earthquakes in Turkey illustrate the possible types that can be used after a disaster (Johnson, 2000). This paper describes the types of temporary accommodation used in Turkey and considers both the short-term and long-term implications of each type.

Incidentally, I would like to point out that one should not look at the question of temporary accommodation without considering that the provision of aid after disasters is a political process. International organisations, NGOs and governments are subject to their political agenda and strategies, which unfortunately can have the tendency to override humanitarian concerns. Although it may often be the case that temporary accommodation decisions are politically biased, in this paper I take a politically unbiased view of its provision; specifically, that the decision as to the type of temporary accommodation to provide after a disaster is or should be based on the best-fit solution and not on political agendas.

MATERIALS AND METHODS

This paper describes the types of temporary accommodation commonly used after a disaster, taking the Turkish example as a case in point.

To define where temporary accommodation lies on the reconstruction continuum, in this paper I begin with an explanation of the stages of post-disaster housing as they are defined by Quarantelli (1995). This is followed by a short description of the 1999 earthquake disaster in Turkey. The next section describes the types of temporary accommodation used, firstly in Turkey and secondly, in other disasters. The last section draws conclusions and highlights the most important points.

There are nine types of temporary accommodation used after disasters, as found in Turkey and elsewhere. While doing field research in Turkey, there were five main types of temporary accommodation I observed and recorded. These were: prefabricated temporary houses, wooden temporary houses, paper temporary houses, winterised tents, and self-built shelters. There are four types of other temporary accommodation referred to in other case studies, which are mobile homes, public facilities retrofitted as lodging, homes of family or friends, and rented apartments.

This paper describes the physical characteristics of each type, its effect on family recovery, and its function in the reconstruction continuum. The information presented here is derived partly from my field research in the earthquake-affected region of Turkey in June and July 2000, approximately ten months after two devastating earthquakes in the Marmara and Bolu regions of Turkey in 1999 (Johnson, 2000). Additional information is also taken from other published case studies on temporary accommodation from

various disasters in the United States; the 1995 earthquake in Kobe, Japan; the 1999 floods in Venezuela; and elsewhere.

DEFINITION OF TERMS: STAGES OF POST DISASTER HOUSING

In disaster research the terms "housing" and "sheltering" are often used interchangeably, with little distinction between the terms. The vagueness apparent in these terms must be clarified to precisely define the phenomena of housing after a disaster. Quarantelli (1995) situates the concept of ideal: "In social science, the ideal does not refer to [what is] desirable, but how the phenomena would look like if it existed in a pure form. Thus, the [ideals] we advance are not intended to be exact descriptions of social reality but as ways of thinking about such realities." Quarantelli (1995) then defines the four stages of housing after a disaster as:

1. Emergency sheltering
2. Temporary sheltering
3. Temporary housing
4. Permanent housing

Actual or potential populations seeking quarters outside of their own permanent homes for short periods utilize *emergency sheltering*. Emergency shelters are typically used for a few hours or possibly for a one-night stay. This stage does not require the arrangement of food for the affected people since the stay is so short. *Temporary sheltering* refers to the populations' temporary displacement into other quarters with an expected short stay. This could take the form of a tent, a second home, a family member's/friend's house, a motel, or a public facility where people will stay for more time than just the height of an emergency. There is no attempt to re-establish household routines; however, there must be an arrangement for the provision of food. The distinction between *housing* and *sheltering* is made on the basis

that *housing* involves the resumption of household responsibilities and activities in the new living quarters, whereas during *sheltering*, normal daily activities are put on hold.

In addition to the four terms, as defined above by Quarantelli, in this paper I also use the term *temporary accommodation*. The term *temporary accommodation* is used to refer to the all the different types of temporary lodging commonly utilised after a disaster. It is important to distinguish between *temporary accommodation* and *temporary housing*, as *temporary housing* usually refers only to very specific types of *temporary accommodation* i.e. dwellings clustered in settlements and built by organisations using industrialised components and standardised designs. But *temporary accommodation* can also take the form of tents, self-built shelters, mobile homes, homes of family or friends' homes, or apartments, where the family will resume their household responsibilities and activities in a location that is intended to be temporary.

Permanent housing refers to the affected population returning to their repaired or rebuilt houses, or moving into new quarters in the community. In most disaster situations in developed countries there is a sharp distinction between temporary and permanent housing. However, in less developed countries this distinction can be blurred: what is initially intended as temporary housing can become permanent housing over the long-term, particularly of none or insufficient formal permanent housing is constructed.

TURKEY: THE 1999 EARTHQUAKES IN THE MARMARA AND BOLU REGIONS

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. The first and larger earthquake on August 17th (M7.4) caused

widespread damage to the towns of Gölcük, Yalova and Adapazari as well as the industrial town of Izmit (population 1 million) and eastern parts of Istanbul. The second earthquake on November 12th (M7.2) largely affected the mountainous towns of Düzce and Bolu, about 100 kilometres to the east of Izmit (figure 12). It is estimated that, in total, 380,000 buildings were damaged or had collapsed. A total of 120,000 dwellings were damaged beyond repair leaving more than 250,000 people in need of housing. The combined death toll from both earthquakes is recognized as being around 18,000.

Figure 12 Towns in Turkey affected by the 1999 earthquakes (source: IFRC, 2000)

The Turkish government instigated a three step accommodation strategy for those affected by the earthquake, beginning with the provision of temporary shelter, then temporary housing and later permanent housing. Tents were provided as temporary shelter for earthquake survivors throughout the affected areas immediately following both earthquakes. Since the winter after the earthquake was quite severe, relief organizations distributed as many winterised tents as possible. During the first winter, as many as 135,000

people stayed in 109 tent camps established both inside and on the outskirts of the cities and towns in the affected region. Many people were also living in small self-provided tent camps set up near their destroyed homes or they constructed self-made structures to serve as temporary lodging.

In October 1999 the Turkish Ministry of Housing announced plans to provide approximately 47,000 prefabricated temporary houses to accommodate up to 151,000 people affected by the August earthquake. This plan was extended after the November earthquake to include survivors in need of housing in the newly affected areas. In August 2000, the first anniversary of the earthquake, governments and NGOs had provided 42,000 prefabricated houses, housing a total of 150,000 people. By then, the majority of the population was set up in temporary housing, but approximately 30,000 people were still living in tents and 70,000 people had secured their own temporary accommodation.

TYPES OF TEMPORARY ACCOMODATION

The following descriptions of the types of temporary accommodation often used after disasters is based on what I observed in Turkey, as well as types of accommodation documented by other researchers in their case studies of other recent disasters. Based on my field research, several types of temporary accommodation were provided, i.e. built, by governments, NGOs and aid organisations for the affected population, though the families may work with the agencies in the design process or the construction of the temporary accommodation. Other types of temporary accommodation necessitate that the users take a more active role in securing their own lodging. However, governments, NGOs and aid organisations have an organisational, managerial and provisional role to play in all types of temporary accommodation.

Before beginning an examination of the nine types of temporary accommodation, I would like to remind the reader that in this paper, I make a distinction between *temporary accommodation* and *temporary housing*. I use *temporary accommodation* to refer to all types of temporary lodging after disasters. *Temporary housing* specifically refers to housing provided by governments, NGOs and aid organisations that are usually constructed with industrialised components and standardised designs and commonly grouped together in settlements that include services and infrastructure.

Prefabricated, wooden and paper temporary houses

Temporary housing refers to accommodation provided by governments or NGOs to house the affected population for the interim period between the disaster and the reconstruction of permanent housing. This housing is provided as soon as possible after the disaster—yet because of procurement, planning, and construction delays temporary housing can take up to a year to be built. The housing is built using industrialised components and standardised designs. Infrastructure—running water, sewage, electricity, and roads—are included in the settlement and dwelling design. The houses are grouped together in settlements that are serviced by public transportation routes, local businesses, garbage collection services and community centres. Large settlements are managed locally, although overseen by higher management. Governments or NGOs own the land or it is leased by these organisations from private landowners. The housing is then rented or leased to the inhabitant either free of charge or for a fee. Families qualify for temporary housing depending on the amount of damage to their former home and their possibilities of obtaining other types of housing. Temporary housing is intended to serve as a place for the families to resume their household responsibilities and activities for a duration of two or more years after the disaster. The longevity of the housing largely depends on the quality of the materials used and the quality of the infrastructure. Typical prefabricated

metal or fibreglass houses, or quality wood or vinyl houses can endure several years while cardboard or low-quality wood houses may only last two or three years.

All villages, towns and cities in Turkey that were affected by the 1999 earthquakes participated, in collaboration with the federal government and NGOs, in constructing temporary housing settlements. The settlements are located both inside the urban areas and on the peripheries. They include basic infrastructure for water, electricity and sewage. While smaller settlements within the urban areas have as little as ten houses, larger settlements on the periphery contain up to 1400 units. Larger settlements include amenities such as central squares, play areas, shops, cafés, restaurants, community centres, daycares, medical units, and bus service. Most of the temporary houses have an adequate plot space around them so that the families can make additions to the house as needed, plant a garden, or generally personalize their home.

I found three major types of temporary housing constructed in the earthquake area: prefabricated, wood, and paper. All the units provided by the Turkish federal government are prefabricated (figure 13). The prefabricated units vary slightly depending on the manufacturer, however they are all built on concrete slab foundations with plumbing and electricity. The units vary in size from 25 m² to 35 m². Units are comprised of one large multipurpose room, a kitchen and bathroom plus one or two bedrooms. Most of the units were manufactured in Turkey, though some were imported from other countries. Each unit was manufactured at a factory and brought to the site for assembly. Although the systems are similar, they vary slightly in size, layout and type of fixtures. In each building, there are two, three or four units back-to-back or side-by side. Kitchens are supplied with a sink, fridge and stove. Bathrooms include a toilet, sink, shower, and in many cases a washing machine.
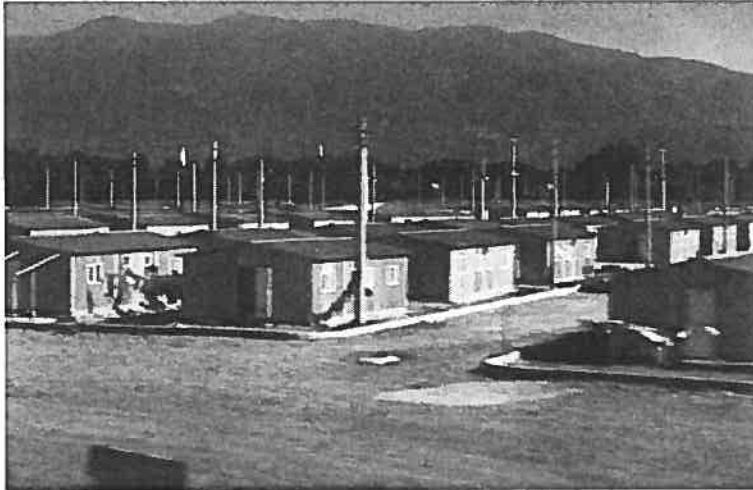
Figure 13 Prefabricated temporary houses in Turkey[2]

Some of the other units, such as those provided by various NGOs, are constructed on-site with wood (figure 14). Each dwelling unit is either a freestanding structure, or a two or four-unit building. The wood frame units vary in size from 20 m² to 30 m². Each unit is outfitted with a kitchen area and a bathroom.

Figure 14 Wooden temporary houses in Turkey

Another settlement, of particular interest, is constructed using paper tubes (figure15). These paper tube houses were also used after the 1995 earthquake in Kobe, Japan. Designed by Japanese architect Shigeru Ban,

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[2] All photos included in this paper are from my field research in Turkey, referenced as Johnson (2000).

these structures are one-room freestanding units without plumbing. The buildings stand on a foundation of beer crates covered with plywood. The walls are constructed solely of paper tubes lined up vertically and supported laterally with steel rebar. The paper tubes act as outer walls and insulation; the inside walls are covered in cardboard sheets. The roof structure is constructed using a wood frame and paper tubes, then covered with canvas sheeting. Some inhabitants have fastened tarpaulins to the outside on the paper tube walls to protect the tubes from rain and snow. Makeshift kitchens have been added or constructed inside the buildings by the inhabitants. Two semi-public prefabricated bathroom units service the twenty-unit settlement.

Figure 15 Paper temporary houses in Turkey

It is apparent that these examples of temporary housing in Turkey positively influence the interim recovery of the population. Each family in temporary housing has a private place where family members can resume their household responsibilities. The plot allows for additions to the house and personalization of space. The temporary housing is located, for the most part, in a convenient location—close to work, schools, transportation and services—so the families are more easily able to resume their daily activities.

The life expectancy of the units depends on the type of materials used in the construction and this is reflected in the initial cost. The prefabricated units are expected to endure several years with proper maintenance. The wood units will endure less time and the quality of the building will decrease more rapidly. Although the paper tube houses are expected to be inhabitable for up to five years, I suspect that their quality will deteriorate within two to three years. The life expectancy of the building should be relative to the amount of time they are expected to be inhabited. Therefore, governments, NGOs and aid organisations may choose the type—and hence cost expenditure—of temporary housing based on the amount of time they expect the houses to be inhabited for.

It is ideal if the life expectancy of the housing matches the length of tenure available for the land the housing is built on. For the most part, the longer-lasting prefabricated units are located on government-owned land on the periphery of the city. The shorter-life wood units and paper units are located within the city limits and are built on land leased from private landowners. As one might expect, I found that the families living in the paper units made less permanent-looking additions and spent less time and money on the beautification and personalization of their property. The reason for this was that they were likely to be forced to move to a new location in the near future. Therefore, if the tenure at a certain location is intended to be for less time, for example, because of land ownership reasons, the expenditure on temporary housing at that location should be less than the expenditure at a location that is available for a longer-term—such as government-owned land. This is true both for governments, NGOs and aid organisations planning temporary housing and for families inhabiting the housing.

The use of temporary housing results in at least a three-stage housing process after the disaster—temporary shelter, temporary housing and permanent housing. It takes several months (and even up to a year) for the

process of procurement, planning, and construction of temporary housing, so the population will need to reside in temporary shelter in the meantime. Once living in the temporary housing, the population will need a permanent housing solution before they can vacate the temporary housing. From the perspective of recovery, this three-stage strategy is beneficial because families have the best housing solution possible throughout the various stages of the recovery process. However, it is expensive. As the United Nations (1982) points out, temporary housing amounts to rebuilding twice over: the construction of the temporary housing plus the later construction of permanent housing. Depending on the disaster-stricken country, the quality of the temporary house may exceed or be equal to the quality of the pre-disaster housing. In these cases, often the temporary housing becomes permanent housing because there is insufficient money or resources to build enough permanent housing for everyone. If this 'permanency' of temporary housing is foreseen and planned for, it is not necessarily negative. However, the quality of the house and the infrastructure, as well as the location and placement of services must be planned from the outset with the inevitable possibility of permanency in mind.

Also, temporary housing can delay the permanent reconstruction because the process of temporary housing consumes the money, resources and time of the organisations assigned to the local disaster-affected region. Yet, if too much time passes before the reconstruction process is completed and people are forced to live in dilapidated temporary housing, this can negatively affect their recovery process (United Nations, 1982).

Winterised tents

Winterised tents, although typically thought of as *temporary sheltering*, can be used over the longer term as *temporary accommodation*. Governments, NGOs and aid organisations provide them for disaster situations where the

climate dictates the need for more protection from the elements than just regular relief tents. In Turkey, relief tents were provided immediately after the earthquake. These were replaced a few months later by winterized tents, which offered a warm shelter from the elements the first winter after the earthquakes. In the spring, as temporary housing became available, the majority of the winterised tent residents were moved into temporary housing. However, during my field visit ten months after the earthquake, many settlements of winterised tents still existed and were being inhabited by those who had not yet secured temporary housing (figure 16).

Figure 16 Winterised tent settlement in Turkey

Winterised tents are made with waterproof fabric and metal structure with a floor and insulation. They usually have a few soft plastic windows and regular framed door. The winterised tents in Turkey were provided by the Turkish military, and therefore resembled military tents. This type of accommodation does not include a kitchen or a bathroom, but they may be connected to electricity. They are erected in settlements or distributed to families who may erect them near their damaged home. In Turkey, most of the winterised tents were constructed in settlement clusters, however some were distributed to families who erected them on or near their property. Many of the families in the settlements built a simple kitchen addition for home cooking (figure 17).

Semi-public prefabricated bathroom units were provided, and one bathroom unit would serve several families.

Figure 17 Example of winterised tent additions

From the perspective of recovery, the winterised tents in Turkey allowed the families a moderately comfortable private space where they could resume their daily activities. With the addition of a kitchen, the families could prepare their own food and no longer had to rely on aid organisations for meals. I visited many families who were still living in the winterised tents during the summer when I was there. Ventilation in the tents was not the best, so families spent much of their time outside under makeshift covered verandas near the tent. The families who erected tents on or near their property, would use their damaged home for living and cooking and would sleep in the tent, where they felt it was secure from the potential danger of another earthquake.

In the reconstruction continuum, winterised tents can serve as what Quarantelli (1995) refers to as both *sheltering* and *housing*. In Turkey, winterised tents were erected to serve only as temporary shelter before the temporary housing was built. If they have been stockpiled, they are relatively quick to arrive and easy to set up. Families can take part in erecting their tent. If there is enough space around the tent to build a simple kitchen and a veranda, the winterised tent can serve as temporary housing. Of course, the

winterised tent will not work as well if it is to be a temporary housing solution over the medium to long-term, like two to ten years. However, I observed that these tents could suffice as temporary housing in a situation where the permanent reconstruction takes place soon after the disaster—within one to two years. If permanent housing will be available quickly, the population can stay in winterised tents, since it is less costly and resource-consuming than temporary housing, yet they allow the families to shelter from the elements and to have a private place to resume their daily activities.

User-built shelters

There are many examples of user-built shelters that serve as temporary accommodation. Families erect user-built shelters using recycled materials or materials distributed by NGOs and aid organisations, such as wood, plastic sheeting and corrugated metal sheets (figure 18). Usually there is no infrastructure—electricity or running water—unless the family is able to connect them somehow.

Figure 18 User-built shelters in Turkey

In Turkey, many families built shelters on their property or near their former home (figure 19). The shelter serves mainly as a place for sleeping while other household activities take place inside the damaged home. Families did not want to sleep in their damaged home because they feared another

earthquake would come at night and harm them when they were sleeping. The first earthquake on August 17th occurred at night and many thousands of people died because they were sleeping and therefore did not feel the first smaller tremors that occurred before the large one. Had the earthquake come during the day, many people would have felt the pre-shocks and they would have left their home to a safer location. Because of this, families felt it was safe to be in their home during waking hours, but preferred to sleep in the self-built shelter, where they believed they were out of harm's way.

Figure 19 User-built shelters (in foreground) near damaged apartment buildings

User-built shelters are inexpensive from the perspective of provision because governments, NGOs and aid organisations may only need to provide materials. There is no cost or time associated with procurement, planning, and construction. Families must have land available near their former homes to build the shelters. Because families are located helter-skelter and are not organized in settlements, it may be harder, however, to deliver other types of aid, such as food and hygiene kits, medical and psychological support and social programs.

Like winterised tents, user-built shelters serve as temporary shelter and can serve as temporary accommodation if the reconstruction process occurs soon after the disaster. Leaving temporary shelter and accommodation up to families allows organisations to dedicate more time and resources to permanent reconstruction. But, if the reconstruction process lags, there is a risk that the shelters may remain and develop into slums.

Mobile homes

The examples of mobile homes as temporary accommodation come from case studies of American disasters (Bolin 1982 and Bolin and Stanford 1991, 1990). The United States Federal Emergency Management Association (FEMA) provides mobile homes or trailers as temporary housing if the disaster is declared as a national emergency. Typically the families are loaned the units for six months while they rebuild their permanent home, however this may be extended if the situation warrants. After the loan period, the units are reclaimed by FEMA, stored, and re-used for the next disaster.

The mobile home units include a kitchen, bathroom, common area and one to three bedrooms. They are heated and have running water as long as they are connected to an infrastructure system. In the case of the likelihood of high winds, the units must be secured to the ground. If the recipients are landowners, the mobile homes are placed on the family's property. If the family does not have land, the units are placed on leased or government-owned land in settlement clusters or in existing trailer parks. FEMA provides the unit, and it is the responsibility of the local government or family to secure infrastructure for electricity and water.

From the perspective of recovery, the mobile homes allow a private place for the family to resume their household responsibilities. If the unit is located on

the family's property, the family does not suffer from any relocation inconveniences, and they can oversee the reconstruction of their home.

On the reconstruction continuum, mobile homes serve the purpose of temporary accommodation only. The mobile homes are quick to arrive and install in the needed location. Depending on the locale of the disaster in relation to the storage location, the units can be made available within a couple of weeks after the disaster. The provision of mobile homes does not hinder the reconstruction process because they arrive as self-contained units; they do not drain construction, management or planning resources in the disaster-affected area. In the American example, there is little risk of mobile homes becoming permanent, since FEMA has a strict policy of reclaiming the units as soon as possible. FEMA's strict reclamation policy pressures the families to find a permanent housing solution quickly. In past cases, it was found that families who had less money to build their permanent home inhabited the mobile units longer. If the family had to rebuild their home themselves or rely on kin or friends to help them, it generally took longer to rebuild than if the family was able to hire contractors to rebuild their home. Therefore, they would end up living in the temporary mobile home units longer.

Public facilities retrofitted as lodging

In many disaster situations, public facilities, such as schools, community centres and hospitals are used as *emergency* and *temporary shelter* immediately after the disaster. Families are given floor space in a public facility to sleep and to keep their belongings. Governments, NGOs and aid organisations look after the management of the facilities as well as the provision of food and other aid. In some cases, families with no other place to go will stay in the public facility well into the *temporary accommodation* phase. That is, they will begin working, going to school and generally

resuming their daily activities while still residing in the public facility. Harada (2000) documents the use of public facilities as lodging after the 1995 earthquake in Kobe, Japan.

Public facilities retrofitted as lodging can be effective as emergency or temporary shelter; however, they have serious drawbacks as temporary accommodation. Public facilities do not offer a great deal of privacy for the families, even though as time passes, families will make adjustments to their space, such as hanging curtains, to create more privacy (Harada, 2000). Management often imposes curfews for the residents to maintain calm at night. Since families do not have a place to prepare meals, the management organisation must provide meals for the residents. Meals are usually served at specific times and people must be available to eat at those times. While this may be tolerable behaviour for a short while during the temporary sheltering stage, it can become a problem during the temporary accommodation stage, since it does not allow the families to regain control of their daily life. It has been found that the longer people must rely on outside aid, the more difficult it is for them to recover (Ellis and Barakat, 1996). Over time, affected families tend to become despondent if they do not have control over basic things such as meals and the freedom to come and go as they please. In extreme cases, such as after the 1999 floods in Venezuela, this can lead to violence and even to drug abuse (IFRC, 2001).

The benefit of using public facilities as temporary accommodation is that they pressures governments, NGOs, aid organisations and families to find a more permanent housing solution quickly. The families will either pressure the agencies to help them or they will take care of the situation as best they can themselves. It is, however, dangerous when people are left in public facilities without prospects of finding other housing, or with no voice to influence those agencies that can help them.

Homes of family and friends

Little formal documentation exists as to the use of family or friends' homes as temporary accommodation. While we know that many families often stay with other family members or friends after a disaster, it is difficult to estimate how many people do this and for how long. However, Bolin (1982), in a study on long-term family recovery from disaster, finds that while people will often stay with friends or family for emergency and temporary sheltering, they prefer to have their own dwelling during the temporary accommodation stage. He interviewed people living in FEMA-provided mobile homes in the United States and found that they were relieved to have the mobile home because it meant that they didn't have to impose on someone or depend on others for their accommodation. While this may be true in the post-disaster situation in America, this may not be true in other countries i.e. people may feel more comfortable staying with family or friends than living in another type of temporary accommodation. However, this is point is uncertain.

From the perspective of provision, staying with family or friends is certainly inexpensive. It also allows governments, NGOs and aid organisations to concentrate funds and resources toward reconstruction activities.

Rented apartments

If, after a disaster, there remains an undamaged stock of apartment housing that is available, governments, NGOs and aid organisations may lease the apartments and offer them to the families whose homes were damaged. Usually families will be given an allowance by these organisations to offset the cost of the rental while their damaged home is being rebuilt. This is an ideal situation; families have a private place to reside while they recover and it does not necessitate the construction of temporary accommodation. Therefore, families and agencies can focus on reconstruction activities.

CONCLUSIONS

To conclude, I would like to reiterate the important points covered in this paper. These are: the 'gap' of time between relief and reconstruction; the role of temporary housing in the post-disaster recovery process; the different amounts of durability of different types of temporary accommodation; the role of governments, NGOs and aid organisations in the process of temporary accommodation; and the temporary accommodation types in Turkey.

After many disasters, there exists a 'gap' between the immediate relief phase and the later reconstruction phase. In the immediate aftermath of a disaster, relief aid is poured into the affected region to help people cope with the crisis. Later, post-disaster reconstruction programs help to rebuild the communities and ultimately increase the level of development in the region. However, in many cases, families affected by disaster do not receive proper support in the interim between these two phases; they effectively fall into the 'gap' between relief and reconstruction. I illustrate this point by using a quote from the Red Cross World Disaster Report (IFRC, 2001),"There is a financial gap in international aid. Relief funds need to be spent within three months, pressuring agencies to pursue short-term projects. Emergency aid has media impact and quick, tangible results—therefore attracting funds rapidly. Later on, long-term recovery projects bring measurable development and lucrative contracts. But transitional aid had less appeal, more complications and therefore attracts less funding" (p.7).

Temporary accommodation is an integral part of the recovery process. It gives families a safe and private place from which to resume their daily activities and to so quickly after the disaster. It is a place for families to restart their lives and ultimately benefit the recovery of their economic, physical and emotional well being. If families do not have access to adequate temporary

accommodation—accommodation that allows them to resume their daily activities—it may affect their recovery in the long-term and therefore the recovery of the region as a whole.

There are at least nine different types of temporary accommodation that are commonly used after disasters. Each type differs in physical form, in cost, in ability to aid recovery, and in procurement, planning, and construction time. Types of temporary accommodation will vary in their appropriateness depending on the particular disaster's characteristics.

Different types of temporary accommodation have different levels of durability, i.e. some types will endure longer than others. It is ideal if the durability of the temporary accommodation matches the amount of time that it is needed for. For example, if the temporary accommodation will only be needed for two years because permanent housing will be available within that two years, there is no need to build temporary housing that will endure five to ten years. On other hand, if adequate numbers of permanent housing will not be completed until five to ten years after the disaster, the temporary accommodation must offer decent shelter until that time. Matching the durability of temporary accommodation to the amount of time it will be needed helps to maximize the time and monetary resources of governments, NGOs, aid organisations, and the affected families.

Governments, NGOs and aid organisations have an organisational, managerial and provisional role to play in all types of temporary accommodation. Some types of temporary accommodation, like temporary housing, winterised tents, mobile homes, and public facilities retrofitted as lodging, are almost completely provided by governments, NGOs or aid organisations i.e. they are funded, planned and constructed *by* these organisations *for* the affected population. However, the families may work with the agencies in the design process or the construction of the temporary

accommodation. Other types of temporary accommodation, such as user-built shelters or homes of family and friends are found or built by the families themselves. Here, the families take a more active role in securing their own temporary accommodation. However, agencies can take a role in helping families to build or find a place to stay. For user-built shelters, they can provide families with construction materials and help them to learn safe methods for construction.

The agencies in Turkey opted for a three-part housing strategy to house the more than a quarter of a million people made homeless by the 1999 earthquake disaster. This strategy included temporary shelter in the form of tents, temporary accommodation in the form of temporary houses and winterised tents, and permanent reconstruction. During my field research in Turkey, I found several types of temporary accommodation. Some, such as prefabricated temporary houses, wood temporary houses, paper temporary houses and winterised tents, were provided in settlements by the government, NGOs and aid organisations for the affected population. Other types of accommodation, such as self-built shelters, were constructed by the families next to or near their damaged home.

Article II: Strategic planning

Strategic planning for post-disaster temporary housing[3]

ABSTRACT

Temporary housing programmes suffer from excessively high cost, late delivery, poor locations, improper unit designs and other inherent issues. These issues can be attributed in part to a prevalence of ad-hoc tactical planning for reconstruction undertaken by governments and NGOs in the chaotic post-disaster environment. An analysis of the process and outcomes from six case studies of temporary housing programs after disasters in Turkey and Colombia in 1999, Japan in 1995, Greece in 1986, Mexico in 1985, and Italy in 1976 yields information about common issues in temporary housing. Based on an understanding of these common issues, this work proposes a framework of strategic planning for temporary housing that identifies organizational designs and available resources for temporary housing before the disaster, yet allows modifications to fit the specific post disaster situation.

INTRODUCTION

Many communities now have pre-disaster preparedness plans for the emergency phase of post-disaster housing; however for the reconstruction phase, even though organisations may have some pre-established recovery plans, they tend toward ad-hoc tactical decision making in planning for housing reconstruction. This is even truer for temporary housing where decisions are made very quickly, within days after the disaster, and actions

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[3] Reprinted, with permission from the editor of *Disasters*, where the manuscript has been accepted, October 2006, for publication in 2007.

are initiated to house people in the interim before permanent reconstruction can be completed. While it is not possible for organisations to account for all of the variables for a temporary housing programme before the disaster occurs, strategic planning which identifies responsible organisations, links between stakeholders and the resources available for temporary housing can increase the likelihood of success of a programme, knowing that operative decisions will have to be made quickly after the disaster.

Past research has found that temporary housing programs suffer from recurrent issues such as cultural or climatic inappropriateness, poor locations, social problems within the camps, and delays due to procurement of shelters, finding sites, and lack of organisational capacities (Bolin and Stanford, 1991; UNDRO, 1982; Davis 1977). UNDRO (1982) states that accelerated reconstruction of permanent housing is preferable to the use of temporary housing. While this may be true, temporary housing programmes continue to be instigated after every major disaster since affected families are in need of a place to live and it can take many months, or even years, to build adequate stocks of seismic resistant housing. Following this fact, this research proceeds from the perspective that temporary housing appears to be a necessary step in reconstruction, so we must determine how to improve its application. Through empirical evidence from case studies of temporary housing projects after earthquakes in Turkey, in Colombia, in Japan, in Mexico, in Italy and in Greece over the last 30 years, this research defines the major issues in temporary housing, and proposes a model for strategic planning of temporary housing.

As stated above, temporary housing occurs after major disasters the world over and from this certain macro-patterns about planning for temporary housing can be deduced, however these patterns must be understood in light of the fact that housing in any country is a product of a country's political economy and the national context. While this study draws out similarities in

the forms and functions of temporary housing across the cases presented, there are of course strong differences in social and cultural customs across countries, not to mention differences in: abilities to pay for housing, financing systems, family composition, formal vs. informal means of housing procurement, culture of building, participation in the housing process, among other aspects. The purpose of this study is then to understand, in a general sense, the macro-issues facing temporary housing, so that they can be integrated into the planning process.

What is temporary housing?

During and after a disaster in which people's homes are damaged or destroyed, families must seek alternative housing until a permanent housing solution can be found. Temporary housing can be considered both a *stage in the process of re-housing* after a disaster, as well as a *physical type of housing stock* used by families during the post-disaster period.

Quarantelli (1995) offers a definition of the four distinct stages of housing that may be employed after a disaster. In this definition, he makes the distinction between *sheltering* and *housing* in the post-disaster scenario in which *sheltering* denotes the activity of staying in a place during the height and immediate aftermath of a disaster, where regular daily routines are suspended, and *housing* denotes the return of normal daily activities such as work, school, cooking at home, shopping, and the like. Based on this distinction, the four stages are (1) *emergency shelter* – may take the form of a public shelter, refuge at a friend's house, or shelter under a plastic sheet, and is generally employed for one night to a couple of days during the emergency; since the stay is so short it does not usually imply the need for extensive preparation of food or prolonged medical services (2) *temporary shelter* - may be a tent or a public mass shelter used for a few weeks following the disaster, and is also accompanied by the provision of food, water and medical

treatment; (3) *temporary housing* is the return to the daily activities of home life and the possible return to work and school, although families will be living in a temporary residence, hopefully awaiting some permanent solution (temporary housing can take the form of a rented apartment, a prefabricated home or a small shack, depending on the context); (4) *permanent housing* is the return to the former home after its reconstruction or resettlement in a new home where the family can plan to live on a permanent basis. Those whose homes are affected by a disaster may or may not pass through all of these stages, and many stages may be employed simultaneously for different sectors of the affected population.

Temporary housing, no matter what form it takes, is the process by which families can begin to recover and reintegrate a sense normalcy in their lives. During the time a family stays in temporary housing, it is desired that family members will also have the chance to plan for their future living arrangements, i.e. permanent housing - whether this means rebuilding, relocating, accessing government programmes or submitting insurance claims. In this respect, a programme for temporary housing does not only include a roof over one's head, but it also must offer aspects that make it possible to get back to real life, such as housing in a location that has reasonably convenient access to services and jobs or an affordable transportation system, proximity to former dwelling if appropriate or desired, maintenance of neighbourhood ties and support system, and guidance on procedures and options for the permanent housing process.

Strategic planning for temporary housing

In temporary housing programmes it is unfortunately frequently the case that ad-hoc tactical planning occurs after the disaster rather than strategic planning up-front before the disaster. Specifically, this means that organisations are making decisions that respond to the immediate situation at

hand—the need to get people housed as quickly as possible after the disaster—and this may be at the expense of taking proper account of longer-term objectives such as the quality of life that temporary housing provides or giving an appropriate level of priority to permanent reconstruction. For temporary housing specifically, it is necessary to identify:

(1) Organisational strategy: Similar to any project in the building industry, temporary housing is generally implemented by a temporary multi-organisation – a group of organisations with different mandates and objectives that comes together to complete the project or programme and then dissipates once it is finished (Davidson, 1988). Various government ministries, aid agencies, foreign and local NGOs, private contractors, private manufacturers, landowners and community leaders may all be involved in a temporary housing project. The combination of the temporary multi-organisation, the chaotic (and sometimes corrupt) post-disaster situation, and the prevalence of ad-hoc tactical planning, means that coordination between organisations is almost inevitably less than optimal in temporary housing projects.

(2) Resources for locating or building temporary housing: Having temporary housing quickly available is of primary importance yet the successful application of temporary housing must also satisfy other objectives such as the families' social needs, long term outcomes of the units and the sites, all viewed within the context of the overall reconstruction programme.

Since the actual need for temporary housing in the event of a disaster cannot be determined beforehand, public resources needed for sheltering cannot be locked into specific pre-planned programmes. Comerio (1998) also makes this point, suggesting that it is necessary to have a variety of contingency sheltering programmes in place, to be activated in stages, depending on the

types of damage and the alternative housing available in the private market at the time and place of the disaster

Figure 20 shows that − ideally − in a sequence of decision-making, planning actions for post-disaster reconstruction begin before the disaster. Though, as has frequently been the case, the 'wait for next disaster' paradigm will prevail, consequently delaying all planning until after the disaster. However, even if the decision is made to plan up-front without waiting for the disaster, the strategic plan requires updating at the tactical level to adapt it to the specific needs caused by the disaster (number of houses destroyed, weather conditions at that moment, situations of the politics and economy). If no pre-disaster strategic planning takes place then stopgap tactical planning will inevitably happen after the disaster; however, in the chaos following the disaster, decisions have to be made very quickly and often on the basis of incomplete information.
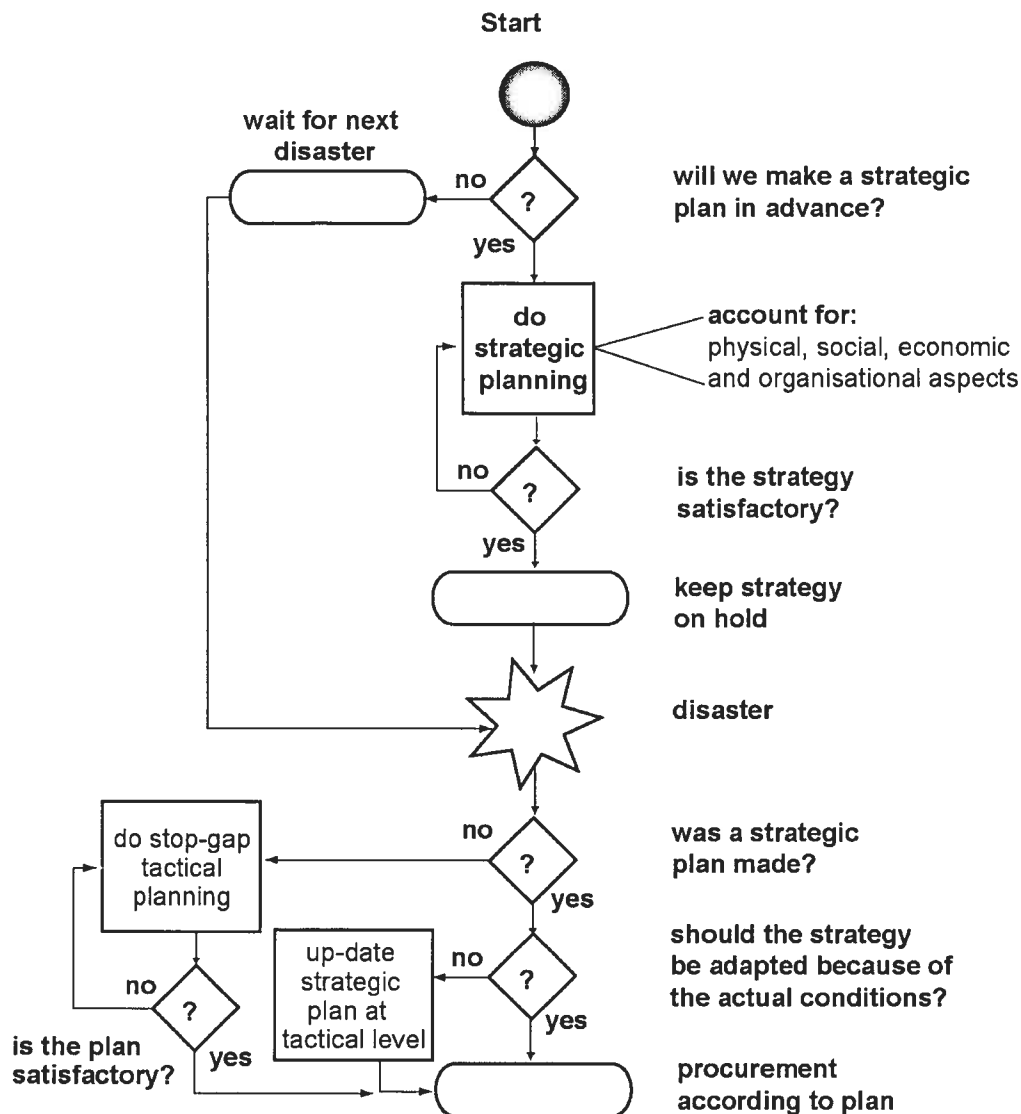
Figure 20 The decision-making sequence for strategic planning or tactical planning for post-disaster reconstruction.

Research Objectives and Questions

The general objectives of this research are:

- To explore the use of strategic planning in past temporary housing projects

- To examine, in a comparative overview, temporary housing projects in order to draw out the main difficulties of the projects
- To define how difficulties may be overcome within a strategic planning framework.

To complete these objectives, this research asks the following corresponding questions:

1. How has strategic planning been implemented in past temporary housing projects?
2. Based on an understanding of project organisation, process and outcomes, what kinds of issues arise in temporary housing projects?
3. Based on the issues identified above, what needs to be addressed in a strategic planning framework for temporary housing?

METHODS

General method

Using a qualitative approach, this research employs a holistic multiple case study design based on the Case Study Method diagram put forth by Yin (1994, p. 49). Empirical evidence from each of the case studies of temporary housing programmes after disasters is individually analysed at the holistic level of the programme. Cross-case conclusions are drawn from the individual case reports. The cases provide both literal replications, i.e. they identify similar patterns, and theoretical replications, i.e. they identify contrasting patterns but for predictable reasons. These findings are then used to develop ideas for strategic planning of temporary housing.

Case study selection

The selections of the case studies are based on the following criteria:

- *The cases are earthquake disasters.* Temporary housing exists after many types of disasters, including floods and hurricanes; however one type of disaster was chosen for consistency, here, the consequences of earthquake disasters

- *The disaster affected urbanised areas.* Temporary housing may be necessary in rural areas but the criteria may be different and therefore can demand a different set of issues and planning considerations

- *The cases involved the construction of temporary housing units.* Families can be temporarily housed in existing apartments or units or with extended families; however all of the cases chosen for this research involved the *construction* of temporary housing units

- *The cases provide evidence permitting literal or theoretical replications* of patterns about strategic planning and various issues in temporary housing.

Based on these criteria, six case studies of temporary housing have been chosen for this paper. The primary case study, of the 1999 Marmara earthquakes in Turkey, is based on empirical evidence collected by the author between June 2000 and July 2004 during field visits to Turkey. The information was collected during numerous interviews with parties concerned with the temporary housing projects, these were: temporary housing residents, citizens, local officials, researchers and Ministry of Public Works staff and also from published reports. Data for the other case studies— Armenia, Colombia in 1999; Kobe, Japan in 1995; Kalamata City, Greece in 1986; Mexico City, Mexico in 1985; and in Friuli, Italy in 1976—have been gathered from accounts of temporary housing programmes previously

published by other authors, and have been purposefully re-analysed in light of the research questions posed in this paper.

Case study treatment

The cases are clearly much more complex that what is presented in these short case studies, especially in terms of the social, political and economic conditions in which the various temporary housing programme are situated, however an effort has been made to bring out the essential elements of the temporary housing programme and present the data in a unified form for comparative purposes. The references provided in the text offer can offer the reader more contextual information. Each case report describes:

- The disaster and its context (summarized in Table I)
- The temporary housing programme and the overall reconstruction including the organisations involved and the project process (summarized in Table II)
- The outcomes of the temporary housing projects.

CASE RESULTS

Table I Synopsis of the earthquake, damages and the homeless situation for each case study

Earthquake	Turkey	Colombia	Japan	Greece	Mexico	Italy
Date	17 Aug. & 12 Nov. 1999	25 Jan. 1999	17 Jan. 1995	13 Sept.; 15 Sept. 1986	17 Sept. 1985	06 May 1976; 15 Sept. 1976
Magnitude	7.4; 7.2	6.0	7.2	6.2, 5.4	8.1	6.4; 6.1
Housing Units Uninhabitable	93 618	6000	247 000	2 870	76 000 – 180 000[4]	32 000
Homeless	300 000 +	n/a	316 000	n/a	30 000 - 200,000[5]	70,000
Total population of affected district/city/region	2.3 million in region[6]	3 million in region	3.5 million in region	42 000 in city	3 million in district; 24 million in Mexico City	500 000 in region
Proportion of homeless	13%	n/a	9 %	n/a	1% - 6.6% in district	14%

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[4] Official government count was 76 000 housing units damaged, an investigative report by the Tokyo Metropolitan Government estimated 100 000 (Aritake et al. 1986) and Newspaper accounts from Mexico City News estimated 180 000 (taken from Comerio, 1998).
[5] NGOs and charitable organisations contradicted official estimates (Mexico City News 19-23 September 1986, taken from Comerio, 1998).
[6] From state statistics for year 2000 (www.die.gov.tr).

Table II Synopsis of the temporary housing project for each case study

Earthquake	Turkey	Colombia	Japan	Greece	Mexico	Italy
Number of units built	40 621	6 000	48 300	2 870	22 000	21 000
Time for construction activities	8 months	Varied from settlement to settlement	7 months	11 months	n/a	8 months
Type	Mostly prefab	Wood/ corrugated iron	Prefab	Prefab	Prefab/ corrugated iron	Prefab
Size	30m²	24m²	20-30m²	~25m²	20m²	~30m²
Average family size	4.6	4.6	2.8	3	10[7]	n/a
Cost (US$)	5 000	n/a	28 000	n/a	n/a	5 000
Lead organisation	Ministry of Public Works	National University of Bogotá	Regional (prefecture) government	Municipality	National Reconstruction Commission	Regional and local administration
Strategic planning	For procurement	None	For procurement	None	None	None

Turkey, 1999 earthquakes in the Marmara and Bolu regions

The disaster and its context

In the latter half of 1999, two large earthquakes stuck the eastern Marmara and Bolu regions of Turkey, to the east of Istanbul, killing over 18,000 people and leaving over 300,000 people homeless. Especially in the first earthquake, the affected areas were heavily populated and fast-growing industrial towns. The widespread destruction and high death tolls were largely a result of shoddy building construction in the 15 years previous to the earthquake, when a lack of supervision and accountability lead to the use of improper materials and construction techniques for five- to eight-storey reinforced concrete apartment buildings.

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[7] This is the average family size in the houses affected by the earthquake, not the country average.

Temporary housing and overall reconstruction

To house the vast numbers of people made homeless by the earthquakes, the Government of Turkey responded with a three-step reconstruction strategy: *tents* offered by the military and Kizilay (the Red Crescent), *prefabricated temporary housing* built by the Government and NGOs, and *permanent housing* built by the Government and through World Bank credits.

For the temporary housing phase, affected families were either given rental subsidies by the government or the free use of a prefabricated temporary housing unit. In total 40 621 prefabricated temporary housing units were built between Dec 1999 and June 2000 throughout the affected region by government and NGOs in 136 settlements, with a 97.5% rate of occupancy (Auditor Chief of the Turkish Republic, 2003). The overall programme was managed by the Ministry of Public Works and Settlements (MPWS), a body with a long history of providing temporary housing after disasters in Turkey. International NGOs involved in building temporary housing cooperated with local NGOs and municipalities to undertake projects in the region with local support. Various governmental bodies, and in a few cases private owners, offered up available land for the temporary settlements; the relevant government directorates installed infrastructure: transport, electricity and water.

The choice to build temporary housing was, in part, based on the fact that local manufacturers' capacity was sufficient to supply the total number of units within a few months. The MPWS set the price at US$3,300 for a 30m^2 prefabricated duplex unit, totalling around US$5000 per unit inclusive of infrastructure costs (Auditor Chief of the Turkish Republic, 2003). The temporary housing units were purchased through a tender process from private prefabricated building manufacturers that already existed within

Turkey. NGOs also bought units from Turkish manufacturers, although in some cases they imported units from their home countries.

Choosing the locations for the temporary housing took longer than expected and slowed down the construction. Since no areas had been pre-identified, it took time to find adequate spaces; for those spaces not owned by the government, contracts had to be negotiated with private landowners.

Outcomes of the project

While some temporary housing settlements were on small parcels of land inside the cities, the majority were in large settlements of up to 2000 units on the outskirts and resembled suburban style developments complete with access roads, bus, garbage and postal services, markets, schools, clinics, and daycare centres—in other words, all the necessary services for a functioning community.

Those who were homeowners previous to the earthquakes were re-housed in permanent reconstructed dwellings about three years later and therefore left the temporary houses in 2002. However, renters and new migrants remained in the temporary units, only to be eventually forced out between 2003-2005 by the government cutting off all services and dismantling the settlements. Many of the sites still remain polluted with residual infrastructure and foundations.

Colombia, 1999 earthquake in Armenia coffee growing region

The disaster and its context

An earthquake on January 25th, 1999 in the east region of central Colombia left more than 800 people dead and over 6000 houses damaged or destroyed

in the cities of Armenia and Pereira and the surrounding rural areas of the coffee growing industry.

Temporary housing and overall reconstruction

As found by Gonzalo Lizarralde during field research in Colombia in 2002 and reported in Johnson, Lizarralde and Davidson (in press), shortly after the disaster, the government appointed a new body, FOREC (Fondo para la reconstruccion fisica y social del eje cafetero) mandated with managing reconstruction resources and outsourcing projects. FOREC selected 32 NGOs to develop different reconstruction projects throughout the region. Initially, temporary housing was not included as one of FOREC's projects, nevertheless there was an intense proliferation of illegal spontaneous settlements after the disaster, as families coped with the need for temporary housing through self-help.

It was not until one year after the disaster that FOREC engaged National University of Bogotá (NUB) and the Centre for Disaster Prevention to manage the temporary housing phase. The NUB was charged with the task of organising and consolidating the illegally-built spontaneous temporary housing and with building new temporary housing units on vacant lots within Armenia. For both the spontaneous and new settlements, the NUB spent time and resources to negotiate contracts for renting the land, either with private landowners or in the case of publicly held land, with the government. It was decided that all parcels of land (some of which were community playgrounds) would have to be returned 3 years later to the original owner, unoccupied and cleared of all debris.

In total there were 6 000 temporary housing units managed by the NUB in 107 in spontaneous and planned settlements ranging from 15 to 150 units. Most of the planned units were very basic structures, 24m^2 each, made of

wood with a mono-pitch corrugated iron roof, a door, one small window and electricity. Most of the buildings contained four units and a lack of cross-ventilation coupled with the corrugated iron roofs made them very hot inside. Communal kitchens and washrooms were located outside the units and serviced several families. The beneficiaries provided free labour for the construction (and deconstruction) of the units and infrastructure (roads, drainage, septic tanks, electricity) although private contractors and sub-contactors oversaw their work.

Outcomes of the project

As part of the temporary housing programme, NUB worked with the families to make certain that they had plans for permanent housing and helped them to apply for government loans and subsidies. Despite NUB's efforts to ensure that families had permanent housing by the end of the temporary housing programme and could therefore vacate the temporary housing after the three years, and despite the very rudimentary conditions in the units, 21 of the temporary housing settlements remained occupied over the long-term. These settlements quickly became crime-ridden communities operating outside the law and occupied by new migrants and those that could not qualify for permanent housing.

Japan, 1995 Great Hanshin earthquake in Kobe

The disaster and its context

On Jan 17th, 1995 a large earthquake affected Kobe City, a port city located in the Hyogo prefecture, causing levels of damage then unprecedented in a modern city. Although there was extensive port and infrastructure damage, housing represented over 95% of the total building damage and 50% of the total value of the damage. It was estimated that 400 000 housing units in 192

000 residential buildings were damaged. Some modern concrete housing suffered damage, but most of the housing damage was concentrated in the densely populated city centre wards where vulnerable older wooden homes were built with heavy tile roofs made for storm protection, and using post and beam structures and mud walls with little lateral bracing. The demographic composition of the affected areas was the more vulnerable sector of society: elderly, students, working class and the poor (Comerio 1998).

Temporary housing and overall reconstruction

For the months following the earthquake, the displaced lived in schools, parks and public buildings that were serviced for temporary shelter (Comerio, 1998).

Temporary housing was provided according to Japan's Disaster Relief Law. Building and supplying temporary housing was assigned to the governor of the prefecture and financed by the national government. The governor was able to apply existing strategies for the organizational process of temporary housing, designs of units, projected costs, supply chain, and profile of beneficiaries (Tomioka, 1997). Flexibility in this strategy allowed for changes in numbers, supply and organization to fit the specifically the Kobe situation.

In total, 48 300 temporary housing units were built by the prefecture, housing 100 000 people. While it was originally planned to build all the settlements in two months, it actually took seven months before all the settlements were finished and the temporary shelters could be closed. The need for such a huge amount of prefabricated building materials was a challenge to the Japanese market so some units were imported from international sources and some were built using non-prefabricated products (Maki et al., 1995). The houses were between 20-30m² and of two types: 1-room plus kitchen units and 2 room plus kitchen units. For elderly persons needing care, settlements

were designed using a communal arrangement. The cost for a 29m² unit was US$28 527[8]. While it was originally planned to vary the size of the units to offer larger dwellings for larger families, to economize on time it was decided that only two types would be offered (Tomioka, 1997).

Finding locations for the temporary housing was particularly challenging. Where possible, the temporary housing was set up in parks and schoolyards within the city but 69% of the houses were located in the suburbs and on Awajishima island, sometimes two hours away from the city centre by bus or train. This meant that many people were relocated to other cities on the outskirts, which were far from medical and shopping facilities; Comerio (1998) describes them as resembling refugee detention centers.

Priority placement in temporary housing went to the elderly, disabled and to single parents; these groups accounted for 70% of the total population in the settlements. In many instances these people had to separate from extended family and services in order to receive the housing; later, cases of depression and suicide among the temporary housing population were attributed to loneliness following from the separation (Maki et al, 1995).

Outcomes of the project

In Japan, by regulations, temporary housing is usually occupied for two years after a disaster, however in this case the temporary housing programme was extended to three years to meet the increased demand (Tomioka, 1997). Even three years after the earthquake, 45% of the houses were still occupied by affected people because of deficiencies in the supply of affordable permanent housing (Hirayama, 2000).

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[8] The cost was quoted by Tomioka (1997) as 2,867,000 yen, which in 1995 equalled US$28 527 (1USD = 100.5 Japanese yen).

The temporary housing programme in Japan was blamed for subsequent social and economic polarization (Hirayama, 2000). To qualify for temporary housing a family had to be living in the shelters and similarly, to be considered for government permanent housing, a family would have to be living in temporary housing; otherwise they were excluded from public programmes. The reconstruction of permanent housing followed a dualist model where needy victims were placed all together and well-off families were encouraged to obtain their own houses on the market.

Greece, 1986 earthquake in Kalamata City

The disaster and its context

Kalamata City, population 41 911, is a small manufacturing and port city that sustained heavy damage or collapse to 44% of its buildings after two earthquakes on September 13th and 15th, 1986 measuring 6.2 and 5.4 magnitude respectively.

Temporary housing and overall reconstruction

As reported by Miranda Dandoulaki (1992) in *Disasters and the Small Dwelling*, due to the numbers of homeless and the threat of aftershocks, tents were distributed to all of the population and it was decided by the City Council a few weeks later to build temporary housing units to house people over the coming winter. To meet the demand of those people whose homes where unsafe or uninhabitable 2,870 housing units were needed.

While it was expected that the temporary housing would be completed in four months it actually took six months because of inadequacies of the pre-existing legislation for emergency situations, which hindered coordination and delayed the identification of suitable land for the housing. The Greek Ministry

of Public Works completed the plans for the layout of sites and site preparation was completed through a collaborative effort by the Ministry of Public Works, the municipality and by private contractors. Time pressure and lack of experience of the parties involved meant that many mistakes were made, especially with regard to the drainage systems, which had to be repaired once the sites were inhabited. Since Greek suppliers were unable to meet the demand for prefabricated units contracts went out to international suppliers who both supplied and constructed the units on-site; the municipality was responsible for distribution of the units to the families as well as managing the sites.

Once the units were distributed to families by the municipality, there were many complaints about the lack of services and facilities in the settlements, such as telephone and postal services, garbage collection, schools, nurseries and community centres. Families had difficulties accessing the city or the shops from the sites since many were badly located or outside of town. Leaking units, faulty electrical systems and bad foundations were common complaints among the residents and the municipality had to make significant investments to upgrade the units and provide amenities in the settlements.

Outcomes of the project

During the second anniversary of the earthquakes, the Mayor of Kalamata stated, "the existence of prefabricated units is the most severe political and social problem of the city". A deadline for the end of 1989 was set for the occupants to abandon the units. Even though permanent housing had already been constructed by then and families had moved into them, the temporary housing was still being used by renters unable to afford post-earthquake rent increases in the permanent housing market, or as storage or second homes by permanent housing dwellers. Some incentives were given

by the municipality to entice people to leave the prefabricated units but this process proved to be lengthy, arduous and politically unpopular.

In addition to these social and political problems, there proved to be technical problems with dismantling the units. It was originally thought that the units could be stored for future use, however, most of the units needed repair, and the difficulty and expense of finding spare parts for the imported designs, not to mention the size of storage space required, made this unrealistic.

Mexico, 1985 earthquake in Mexico City

The disaster and its context

On September 19th, 1985, an extremely powerful earthquake caused severe damage to modern constructions and slum dwellings in the historic centre of Mexico City. Housing damage was mostly concentrated in a few high-rise public housing developments built as part of a government low-cost housing programme in the 1960's and in many dilapidated low-rise tenement apartment buildings called *viviendas*. Working and middle class families had occupied the *viviendas* for 20-30 years paying very low-rents for over-crowded units (average of 23m² and 10 people) but well located and affordable (Comerio, 1998).

Temporary housing and overall reconstruction

Soon after the earthquake, a new body, the National Reconstruction Commission (NRC), was formed and given a two-year mandate to complete all reconstruction works. This new body had considerable political power and a large funding base from the World Bank. Dynes, Quarentelli and Wenger (1990) hypothesized that the NRC was formed to avoid a potentially explosive political situation if assistance was not given to the homeless. While the NRC

oversaw four different reconstruction programmes which built or repaired 88 000 permanent housing units, a temporary housing programme was also included. Nonetheless, countless families were left out of the formal programmes and forced to rely on community groups and self-help for housing recovery.

The temporary housing programme consisted of rental assistance for 20 000 families as well as the construction of 400 provisional camps of prefabricated units, housing 22 000 families. The prefabricated units were very basic 20m² boxes made of corrugated iron sheets; kitchens and bathrooms were shared by groups of 20 families (Comerio 1998).

The interesting element in this case is that the units were all located in the affected communities next to the damaged buildings on small open spaces and along rights of way. This meant that families could maintain their social ties and remain close to work; it also helped them to have a voice in the permanent reconstruction programme.

Outcomes of the project

As mentioned, the NRC managed both the temporary housing and the permanent housing, which meant that these two programmes were closely integrated. Temporary housing was seen only as a means to house people while reconstructing permanent housing, and families knew from the outset about their future plans for permanent housing (Bolton, 1997). So as not to detract from permanent reconstruction, the temporary dwellings were rudimentary (very small, crowded, with only shared kitchens and bathrooms), cheap, and were only intended for use over a very short period.

Italy, 1976 earthquake in Friuli

The disaster and its context

In the province of Friuli, Italy, two major earthquakes in 1976 caused extensive damage to a very large area, 4800 km² of mountain and hill towns of the Friulian people. The earthquakes reduced to rubble many settlements rich in cultural heritage that had been occupied for centuries.

Temporary housing and overall reconstruction

After the first earthquake, which occurred on May 6th, 1976, Friulians adopted the motto, "dalle tende alle case" meaning "straight from the tents into new houses." They wanted to skip the temporary housing phase and go straight into reconstruction right away. However, after the second devastating earthquake struck in September 1976 there were 70,000 people homeless and they decided that a mass evacuation over the winter would be necessary as well as temporary prefabricated housing to return to in the spring (Geipel 1982).

In total, 25,000 people evacuated during that first winter to tourist hotels and apartments in the coastal towns along the Adriatic Sea. Since the tourist industry was a major source of income for the region, the hotels and apartments had to be vacated before the beginning of the next tourist season in mid-April 1977, this pushed the timeline for the construction of temporary housing.

On April 30th, 1977, the programme was officially terminated; the prefabs had all been constructed within an 8-month period following the second earthquake. In total 21,000 prefabricated units were built: 49% by the Italian

Emergency Commissioner, 45% by the regional administration and 6% by foreign governments and private relief organisations. All of the settlements were provided with water, sewage and electricity and wherever possible these were hooked up to existing infrastructure. There were 36 diverse designs of prefabricated housing provided by as many manufacturers, all of which offered different levels of comfort. The variations in quality caused some resentment among the beneficiaries, as some families received much higher quality housing than others; the beneficiaries even refused some houses because they were not suitable for the climatic conditions (Geipel, 1982). On average 12m² of housing per person were provided and the total cost of construction worked out to US $1750 per person (1978 dollars) (Geipel, 1991).

The location of the settlements varied depending on the situation in the particular commune and local representatives were responsible for designating land. In most cases, "Baracopolis" settlements (as they were locally named) were located just outside of the built up area in long rows of houses. Some communes managed to push for the prefabs to be located inside the communes or next to the damaged houses (Geipel, 1982).

It was found that the solution of grouping the prefabricated housing offered the opportunity for the community to re-establish a certain level of cohesion and for community involvement in the town planning process for reconstruction. One commune set up the prefabs around courtyard groupings that corresponded to the pre-earthquake residential cells in the old towns and representatives from each of the courtyards were involved in town planning for the reconstruction programme for the commune (Geipel 1982).

Outcomes of the project

Just like in the Turkish and Greek cases, the temporary housing in Friuli, Italy was inhabited for much longer than was intended. Permanent private reconstruction began about 1.5 years after the disaster and lasted through to 1982, when almost all of the families had repaired or rebuilt their houses thus giving up the right to the temporary units. However, in June 1986, ten years after the earthquakes, there were still 8 206 families or 13.3% of the area's total population living in temporary housing. Only 35% of the families living in temporary housing had a legal title to be living there because they still lacked a reconstructed or repaired final place to live, the remaining 65% were effectively squatting (Geipel, 1991). The duration of use was not only related to the timeline for reconstruction but also to the fact that squatters, young families and elderly people used the temporary housing as more or less permanent residences.

Socially, the temporary housing provided opportunities to many families over the long-term, however it became a burden on the government and communities that hosted these settlements. Geipel's (1991) account of the long-term consequences of the disaster states, "Care was not taken to make sure that once ready-built homes were provided, the occupancy of prefabs would be terminated. More efficient supervision or other suitable measures should have been enacted in order to make leaving the huts more attractive" (p 40-41).

FINDINGS

Any temporary housing programme or project is a reflection on the housing needs at a particular point in time, given the availability of money, supplies and manpower. The decisions of why and how to provide temporary housing, as well as its overall effect on recovery, reflect the particular social, economic and political situation of the country in question. Nevertheless, a synthesis of the findings from the case studies offers the ability to draw some conclusions

about issues with temporary housing projects and about strategic planning for temporary housing. These conclusions are presented below as direct answers to the research questions posed earlier.

Question 1: How has strategic planning been implemented in past temporary housing projects?

Up-front strategic planning did occur both in Turkey and Japan, however not in the other cases. The use of up-front strategic planning in Turkey and Japan meant that the temporary houses were built relatively quickly and were therefore successful in terms of timing, nonetheless, the projects still suffered from other issues.

In Turkey, the temporary housing programme drew heavily on pre-existing organisational structures, policies and laws for post-disaster reconstruction. Within the Ministry of Public Works and Settlements (MPWS) there is a General Directorate of Disaster Affairs (GDDA), which is a division with experience in post-disaster reconstruction including procurement and production of temporary housing after previous disasters in Turkey.

The Japanese government had done more systematic strategic planning than in Turkey offering precise definitions of organisational design and numbers even before the disaster. For example it was planned that the governor of the prefecture would be in charge, financing would come from the national government, up to 30% of people who lost their homes could qualify, the size of unit would be 26.4 m² and the length of stay would be 2 years. Due to the magnitude of the damage and the profile of the affected families, some of these decisions had to be revisited after the disaster.

In Greece there was no strategic planning before the earthquakes and therefore the temporary housing project was a result of post-earthquake

tactical planning which tried to respond to the situation at hand. Existing organisations with little experience in emergencies, i.e. the Municipality of Kalamata, the Ministry of Public Works and private contractors were brought together after the disaster to work as a temporary multi-organisation. While these organisations were well positioned in the environment in terms of power and resources, they had had little collaborative experience, especially working under such stressful conditions. The problems in this project arose out of the need to make decisions quickly after the disaster; however few plans or expertise were available to fall back on which delayed the projects significantly.

In Italy, as Alexander (1986) points out, the policy for disaster planning relied on extraordinary measures after a disaster rather than up-front preparedness planning. The lack of strategic planning meant that appropriate building specifications and preset procurement methods had not been determined. Many of the prefabs coming from international suppliers did not meet the necessary standards for the cold climate in the mountainous Friuli region. For example, the Emergency Commissioner purchased 37,000 m² of prefabricated housing from a Canadian company, Atco, which were not well suited to the environment and subsequently required more investment to install new roofs and heating equipment. Also, since procurement methods had not been identified, representatives from prefab companies tried to exert influence over commune governments to buy their product. Geipel (1982) writes, "it must be taken into account that the hasty assignment of major responsibilities in more or less chaotic conditions, subjects the integrity of decision-makers to a severe test of sturdiness. Prosecutions in the summer of 1977 showed that not all of them could resist the temptations of corruption." (p.119).

Research Question 2: Derived from an understanding of project organisation, process and outcomes, what kinds of issues arise in temporary housing projects?

Based on the findings from the case studies, it is possible to identify a few common issues in temporary housing projects. These issues are described as general objectives for planning temporary housing and are listed under the following headings: (1) Timing, (2) Cost, (3) Overall reconstruction, (4) Unit Design, (5) Location, (6) Services, (7) Social networks, (8) Institutional support, (9) Long-term uses and outcomes.

1. Timing - having temporary housing available quickly

The most important aspect of any temporary housing programme is that it be available for the affected families as soon as possible so that they can return to their daily activities and begin the recovery process. Often a greater expenditure is needed, i.e. procuring housing units internationally, or trade-offs have to be made regarding choices of locations to ensure that the temporary housing is available in a timely fashion.

The case studies show that irrespective of the total number of units built in each project, it took between six and eleven months to complete the projects. Interestingly enough, neither the timely supply of building materials nor the construction of units or infrastructure was found to be problematic in any of the cases.

Finding suitable locations proved to be the main hindrance in the rapid provision of temporary housing. In every single case, the identification of a suitable location and securing leases for these locations (either with government or private landowners) slowed down the provision of temporary housing.

2. Cost - relative to country standards and cost of permanent housing

The cost of temporary housing is an important issue because 1) the cost varies greatly from country to country and 2) temporary housing is expensive in relation to its lifespan. However, the reuse, sale or recycling of units (if economically, technically or politically possible) may reduce overall life-cycle costs.

If we compare temporary housing units with similar specifications in Turkey and in Japan, we see that in Japan each unit costs US$28 000 each while in Turkey, US$5 000. This underlines the problem of importing temporary housing units from industrialised countries to developing countries. While it is fine for Japan to acquire units anywhere on the market, for countries with weaker economies the costs of importing units from industrialised countries is too high; however sometimes these units will be given as donations.

Generally temporary housing is exceedingly expensive both in relation to its lifespan (probably a few years) and in relation to the cost of a permanent house. For example, in Friuli, Italy, the construction and demolition of the temporary housing worked out to US$560 per 1m² of housing, which as reported by Geipel (1991) is only slightly less than the Italy's average cost per m² for permanent living space.

Costs for temporary housing can also be recouped though the sale of units, reuse of units or by recycling the materials (see below, 9. Long-term uses and outcomes)

3. The overall reconstruction strategy – consideration of all stages of reconstruction

Temporary housing is usually only one phase of the overall reconstruction programme, which will probably also include tents or mass shelters and permanent housing. Any reconstruction programme has a limited amount of financial, human and machinery resources and if temporary housing consumes disproportionate amounts of resources, it may negatively affect the ability to carry out other parts of the reconstruction programme.

Maki et al (1995) contest that in Japan proportionally large investments made in temporary housing were at the expense of government investments in permanent housing. It was expected that market forces would solve the permanent housing supply, so while a public housing scheme was planned shortly after the earthquake, the government made no solid financial commitment toward it even though they were spending millions on temporary housing. A few years later, the poor people from the inner city who could not afford market rates for permanent housing were accommodated in permanent public housing, but only in inconvenient locations on the outskirts of the city.

Likewise, in Turkey, heavy investments were made in temporary housing (estimated at US$225 million) and many were fearful that this would negatively impact the reconstruction of permanent housing (results of social survey by Dr. Ayfer Bartu and reported in Annex 13 of World Bank, 1999). An extensive permanent housing programme did exist for which construction began one-year after the earthquakes (a few months after all the temporary housing was completed). However the government had to seek funding through loans from the World Bank and other international lenders to finance the permanent housing projects.

These cases in Japan and in Turkey can be contrasted to the reconstruction programmes in Mexico and in Colombia that offered very basic and inexpensive temporary housing and placed most of the resources on permanent housing. Figure 21 shows that in Mexico and in Colombia clearly

the major objective was to solve the problem of permanent housing, demonstrated by how these programmes got underway immediately after the disaster. Temporary housing was only proposed as a stopgap to shelter families while works for permanent reconstruction were in progress.
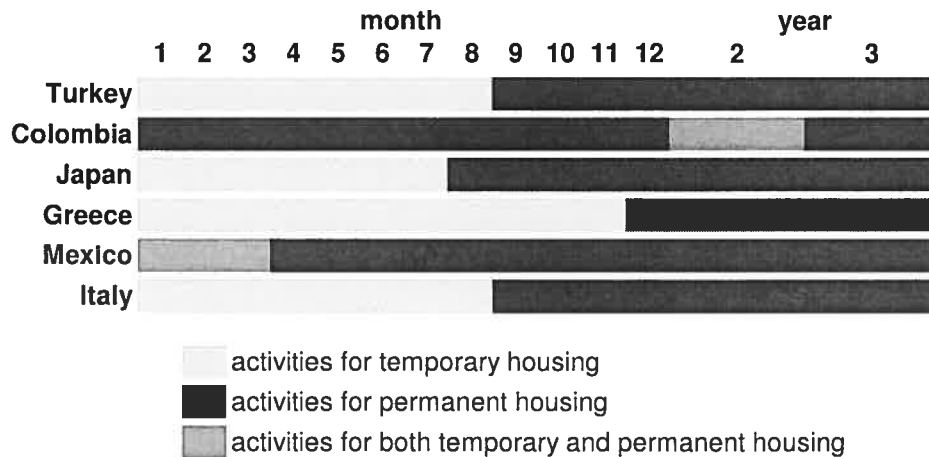
Figure 21 Timeline for temporary and permanent housing activities, for each case study shows how in Colombia and Mexico activities for permanent housing began right away after the disaster.

4. Unit Design - adequate level of comfort for the local conditions

A temporary house is meant to provide safety from the elements and fire and provide at least a minimum of sanitary conditions, but the level of comfort it provides must match local living standards. The exact meaning of the term "adequate" must be defined locally since what is deemed an adequate temporary house depends on climate and local living conditions of the affected population. In some disaster areas, a basic wooden structure with shared kitchen facilities and an outdoor bathroom is tolerable whereas in another disaster situation temporary housing would not be adequate without insulation, hot running water and closed bedrooms.

In Colombia and Mexico infrastructure and unit construction costs were comparatively less than the other cases since they used basic materials

(corrugated iron and wood), and communal kitchens and bathrooms. Meanwhile in Japan, Turkey, Greece and Italy the temporary houses were comparatively high-quality manufactured units with in-unit kitchens and bathrooms.

While it is not within the scope of this research to judge whether the basic dwellings in Colombia and Mexico were adequate compared to local living standards or, on the other hand, that it was necessary to provide such comparative luxury in the other cases (criticisms about the unit designs appear in every case), the point must be made that the quality of the temporary units has to be linked to local living standards.

5. Location - provides convenient access to jobs and social networks

As suggested above (see, 1.Timing), finding suitable locations for temporary housing is problematic. While it is preferable to have temporary housing located in or very near the disaster-affected areas, the case studies show that it proves difficult to find enough vacant government land. Agreements can also be made with private landowners, but this often takes time. For the agencies involved it is often quicker and less complicated to build temporary housing in periphery areas. However, this means that agencies need to provide extra services, and for families, the locations are not convenient for work or income-generating activities and cause social isolation. A frequent and inexpensive bus service is necessary if a periphery location for temporary housing is chosen.

In Mexico and in some of the projects in Italy, the communities were able to take a larger role in the reconstruction activities because the temporary housing was located in or near the affected areas where rebuilding was taking place (Comerio, 1998; Geipel, 1982).

6. Services - is accessible to, or provides, the necessary services and amenities

The provision of extra services (schools, medical clinics, public transit, shops, cafés, religious buildings, post office, etc.) for those living in temporary housing will be necessary if the housing is located at a distance from existing city services. If temporary housing is in the city, families can use existing services, assuming that they were not too badly damaged in the disaster.

In Turkey and in Japan, the vast majority of the temporary housing was located outside the cities, making it necessary to also provide services. For example in Turkey, the settlements resembled new suburbs, complete with mosques, community centres, shops and coffee shops – which added to the overall cost of the project.

7. Social Networks - the occupants can maintain pre-disaster social ties or can develop new agreeable ones

Another reason for having temporary housing in or very close to the disaster-affected areas is that families can benefit from the supportive atmosphere of their social ties, which is an important factor in recovery. As was exemplified in the Japanese case, if families must move out of the area for temporary housing it is preferable that they have some choice about the community they move to, and especially for the elderly, it may be necessary to have social spaces and provide organized activities to meet others.

8. Institutional support - helping families secure permanent housing

Bolin (1982) in an American study found that families which lack a clear and feasible plan for getting back into permanent housing will have a harder time recovering psychologically from the disaster. In the Colombian case the NUB

helped families secure permanent housing by navigating them through government loan programmes or organizing them into community groups to secure permanent housing. In Mexico, it was found that families were more tolerant of living in the basic temporary housing because they knew about their options for permanent housing (Bolton, 1997).

9. *Long-term uses/outcomes of units – consideration of what will happen to temporary houses*

There are two points to make regarding the issues with temporary housing in the long term. First of all, temporary housing is always inhabited for longer than anticipated; secondly, the units or materials from the units, once vacated, can be reused for another purpose. These points are examined below.

In all of the cases presented here, the temporary housing was inhabited for longer than anticipated because of the lack of affordable housing available in the earthquake-affected areas. Even once permanent housing is reconstructed, temporary housing remains in use because of one or a combination of the following reasons:

(a) Permanent housing is not available for all sectors of society; renters cannot afford the increase in market rents after the disaster and do not qualify for permanent-housing subsidies usually aimed at homeowners. Therefore they try to remain in temporary housing.

(b) New migrants come to the area and take up residence in the temporary housing because of the relative affordability of this housing (sometimes free).

(c) The availability of temporary housing allows the modernization of family life. Young families or elderly people reside in the temporary housing, giving them the opportunity to live apart from the rest of the family.

These realities point to the fact that the long-term use of temporary housing offers many positive opportunities for the community, especially when affordable housing is in short supply. However, it was found that in Colombia, for example, that there were negative social consequences of this, as the remaining temporary housing settlements were laden with crime. In Greece, Turkey and Italy, the long-term use of temporary housing was expensive for the government who had to subsidize administrative and operating costs of the facilities over an extended period of time.

In all of the cases also, the temporary housing units, or materials from the units (wood, corrugated iron) could be reused, stored or recycled. In Turkey, the units were either refurbished and stored for later use or sold by the government at approximately US$1 200 each to businesses, institutions and families for reuse as houses, sheds, dormitories or other facilities.   In Greece, the government was planning to store the units, but they found that the cost for this was prohibitive. In Colombia, the materials from the units could have been recycled had there been policies in effect that allowed the users to own them after the project was finished. What is important to note here is that the temporary housing unit or materials were useful for a 'second life'; however some type of organisational strategy was needed to facilitate this.

Research Question 3: Based on above identified difficulties, what needs to be addressed when planning for temporary housing?

Combining the decision-making sequence outlined in Figure 20 and the common issues described above, Figure 22 proposes planning factors that can be integrated into a strategic planning framework for temporary housing.
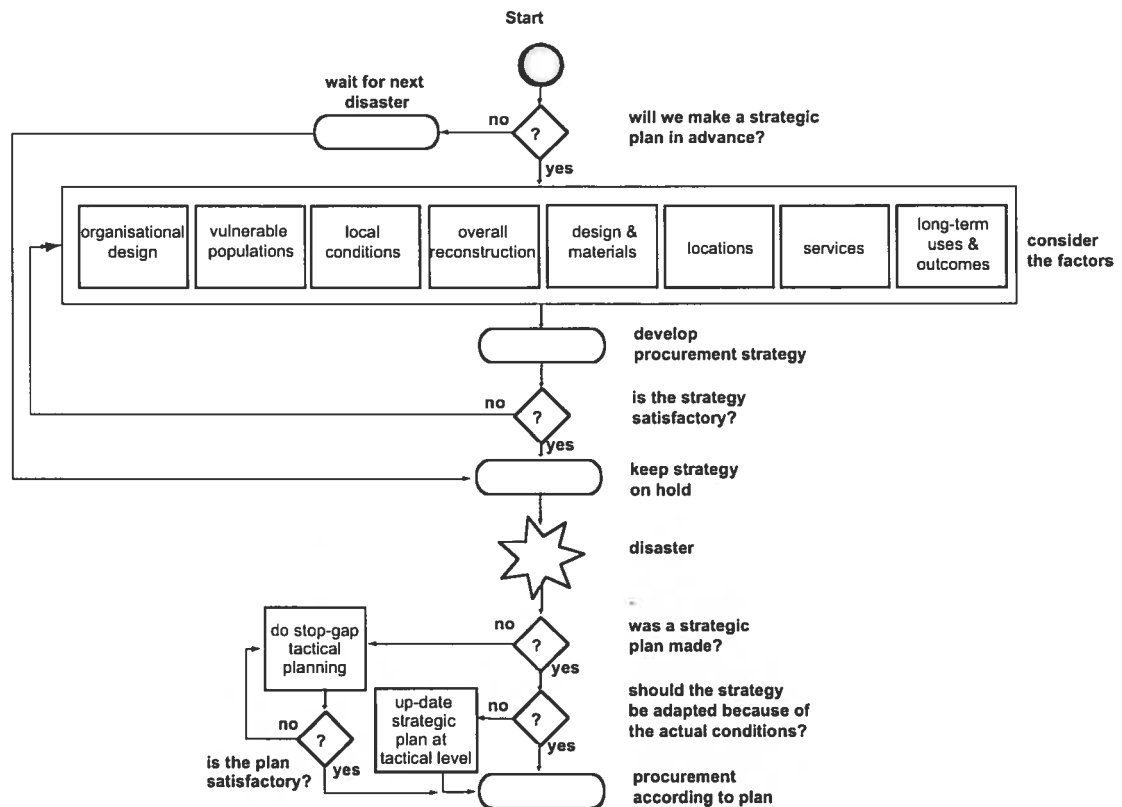
Figure 22 The decision making sequence adapted specifically for planning temporary housing.

Based on Figure 22, if it is decided to make a strategic plan in advance of the disaster, strategic planning will need to take into account:

a. *Organisational design:* appointing an organisation that is responsible for the overall reconstruction strategy and defining the temporary multi-organisation involved in the reconstruction programme and the methods used to form it (e.g. procurement policies).

b. *Identifying the vulnerable populations*: it is often renters or people living in marginal areas that will be the most in need of temporary housing.

c. *Understanding local social, economic and climatic conditions* to understand what sort of housing is the most appropriate considering the situation.

d. *Developing the overall reconstruction strategy:* temporary housing is only a part of the overall reconstruction programme.

e. *Design and materials:* Defining, as much as possible, designs and suppliers that uses locally available materials or units that can be supplied in a quick and cost-effective manner.

f. *Choosing suitable locations* as close as possible to the affected communities and easily accessible.

g. *Identifying services* that will need to be a part of the project and identifying the organisation that will provide them.

h. *Planning for long-term uses and outcomes of the temporary houses.* A plan for whether the units will be rented, sold, or dismantled and stored; what kind of site clean up will be needed, when this will be likely to happen and who will be responsible for it.

Once this strategy is completed, it can be kept on hold. If (or when) a disaster does occur, the strategic plan must be up-dated at the tactical level to correspond to the particular disaster situation. If the "wait for next disaster" scenario prevails, these same factors will need to be addressed, however there will be little time allocated to accumulate information about them; consequently the quality of decisions will be prejudiced.

Article III: Organisational design

A Systems View of Temporary Housing Projects in Post-Disaster Reconstruction[9]

ABSTRACT

Natural cataclysms (earthquakes, hurricanes etc.) 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

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results emphasize that the performance of reconstruction projects is directly linked to the design and management of the project team.

INTRODUCTION

It is only too well known that – each year – thousands of people are killed and many times more made homeless because of natural disasters[10]. 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 losses; in earthquakes, they 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 (Kellett, 1992; Turner, 1976). 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

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[10] Over the last century, 15 million people were killed or suffered serious injuries and 100 million had their houses destroyed by earthquakes (Hewitt, 1997). 1300 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 thousand million.

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 (Johnson, 2002). Figure 23 shows the planning mechanisms linked to a disaster situation; it shows that either most decisions are made in advance of the catastrophe or that they will have to be made afterwards (if indeed possible), with additional precious time being wasted instead of "getting on with the job".
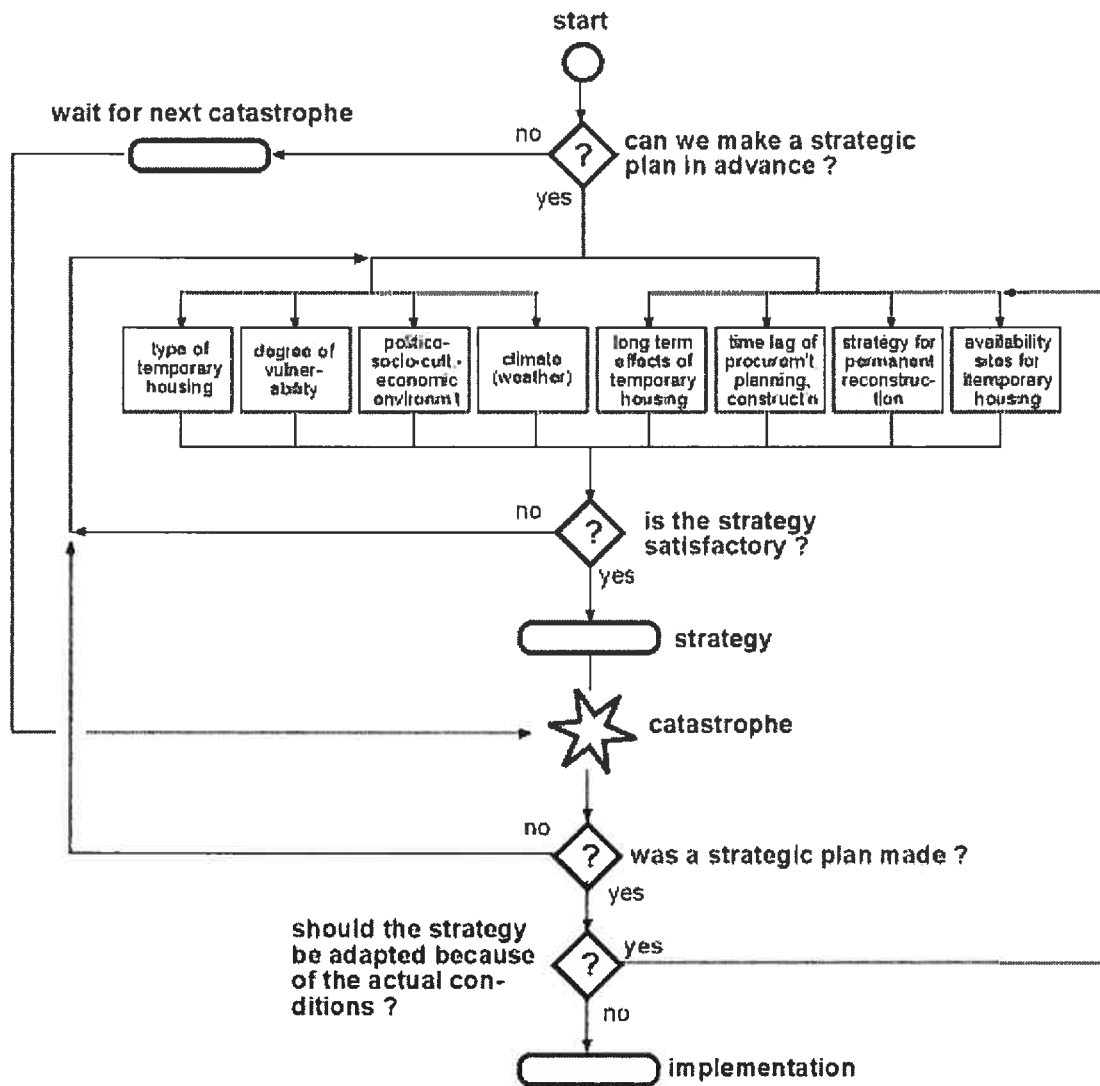
Figure 23 Strategic planning prior to a natural disaster – or not. Source: adapted from Johnson (2002).

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),
- 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? (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 (Gilbert, 2001; UNDRO, 1982, Davis 1978). 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 (Aysan and Davis, 1992; Bolin, 1982; Bolin and Stanford, 1991; Comerio, 1998; Dandoulaki, 1992; Ellis and Barakat, 1996; 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 are 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 to 'soft' infrastructure (postal and bus services, markets …)?

- *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[11]. 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)

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[11] See, for example, the definitions proposed by Hall (1962).

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 *organizational* subsystem 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[12].

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? etc.)
- 'hard' products to be included (shelters, kitchens, latrines, etc) and 'soft' services to be provided (medical and psychological aid, employment opportunities, security, etc.).

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[12] 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".

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:

1. 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?)

2. 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?)

3. How does the environment impact the temporary housing project? (Including: the impacts of the socio-political context, the community, etc.)

To answer these questions, a database of case-histories was prepared, including some projects reported in the literature[13] and others visited to yield information first-hand[14]. 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

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[13] Published case histories of post-disaster housing projects include Mexico City earthquake, Mexico 1985 (Comerio, 1998); Kobe, Japan earthquake 1995 (Harada, 2000; Tomioka 1997); Kalamata City, Greece earthquake 1986 (Dandoulaki, 1992); Skopje, Macedonia earthquake 1963 (Ladinski, 1997); Iranian earthquakes in 1997 (Ghafory-Ashtiany, 1999); earthquake in Friuli, Italy 1976 (Geipel, 1991); various disasters in the United States (Comerio; 1998; Bolin, 1982; Bolin and Stanford, 1991).

[14] 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.

a major component of urban temporary housing. They concern two cities 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. Both projects 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 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 CASES

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 thousand million or around 3% of the Gross National Product.

The reconstruction program

The current Turkish Disaster Law guarantees 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 program.

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 Organisations (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

Public institutions

	Prime Minister
Turkish Development Bank	MPWS
	Directorate of Disaster Affairs
Units in charge of permanent housing	Pre-fab settlements division

State Road Works — Pre-fab Companies

State Electric Company — Building Contractors

Housing & Social Services Foundation — Land Owners

Beneficiaries

legend:

■ visible head responsible of the project

□ direct responsible of the project

□ unit working on the project

underlined unit created for the project

unit not intergrated in the project

Figure 24 Organizational design of the temporary housing project in Turkey.

Figure 24 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 road works 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 4 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 25).
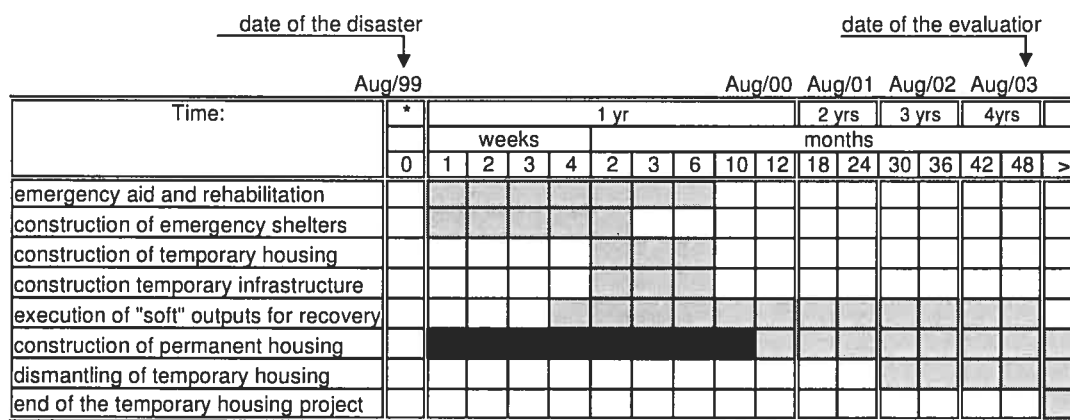
in black: the time that people lived without permanent housing

Figure 25 Schedule of the main activities of housing reconstruction in Turkey

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$5000 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 expenditures for the government funded project was 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 1000 units, mostly on the outskirts of urban areas (Figure 26), which also included roads, community centres, bus service, garbage collection, postal services and commerce.
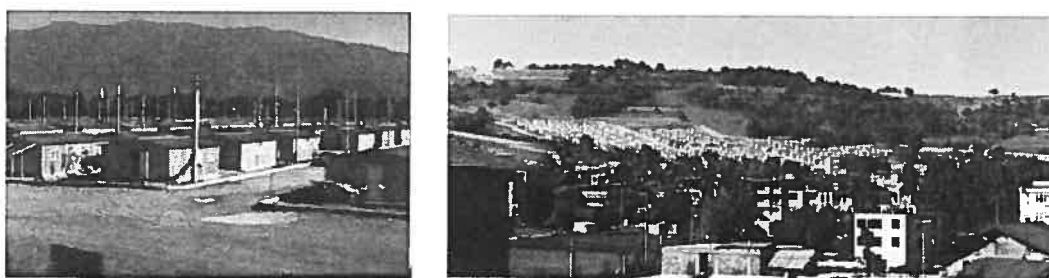
Figure 26 Views of the temporary housing settlement built in the outskirts of the cities of Adapazari and Izmit.

Outcomes

On the one hand, the temporary housing program provided safe and comfortable, but small, housing for people in need; it reduced dependency on government of the people previously living in winterised tents (the inclusion of bathrooms and kitchen in the units provided privacy for families), and the housing program was linked to other social programs - food aid, health care packages, mental health counselling, etc. Furthermore, the program contributed to political popularity; the government was seen as "doing something for the people" (Jalali, 2002).

However, the approach adopted for locating the temporary housing generally outside city limits lead 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 would be "political suicide".

However, since average rental prices for an apartment unit had more than doubled since the earthquake, the temporary housing 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 January 25, 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.

The reconstruction program

Just after the disaster, the Colombian presidency formulated a reconstruction program 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 (~50%). To carry out the projects, FOREC launched a call for proposals that resulted in the selection of thirty-two 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:

- 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.
- 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 program. The temporary housing project, in which the NUB was the project developer, was part of that large program. 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 27 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 land owners (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 handed back to the owners - "unoccupied and cleared".
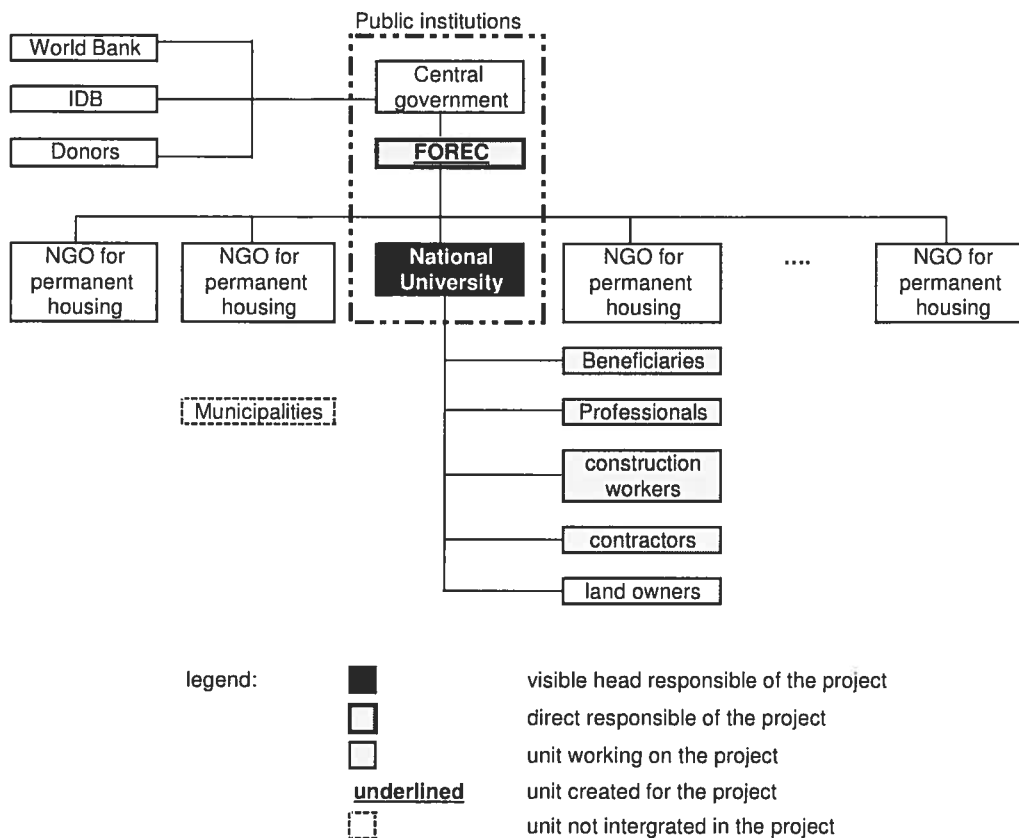
Figure 27 Organizational design of the temporary housing reconstruction project in Colombia.

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 sub-contractors were hired for security, cleaning, construction of infrastructure, etc.

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 (Figure 28). 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, etc), 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 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, etc.) 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.
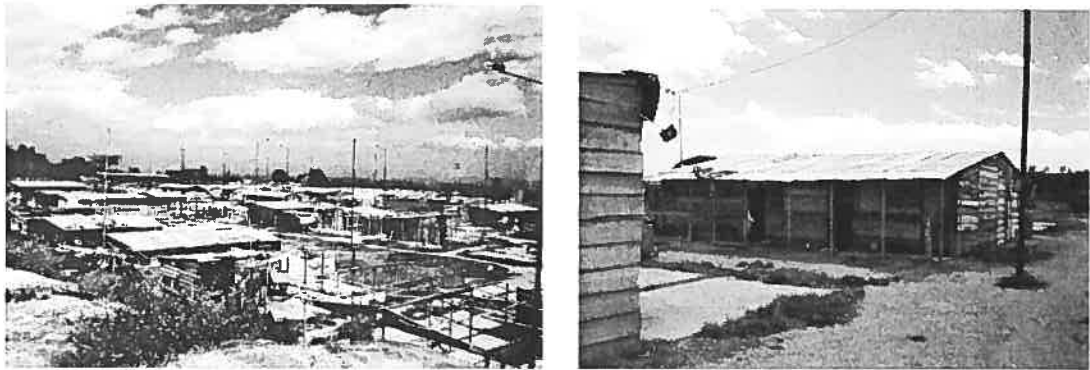
Figure 28 Views of one of the temporary housing projects in Colombia

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 29). 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.

in black: the time that people lived without permanent housing

Figure 29 Schedule of the main activities of the housing reconstruction project in Colombia

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 5000. 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 systems of the city. They were occupied by families that did not or could not apply for the permanent housing subsidies offered (e.g. 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 yearlong 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 program 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 footnote 13), 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 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 programs were well under way. In Colombia, a combination of squatter shelters (subsequently improved) and minimum 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 30.
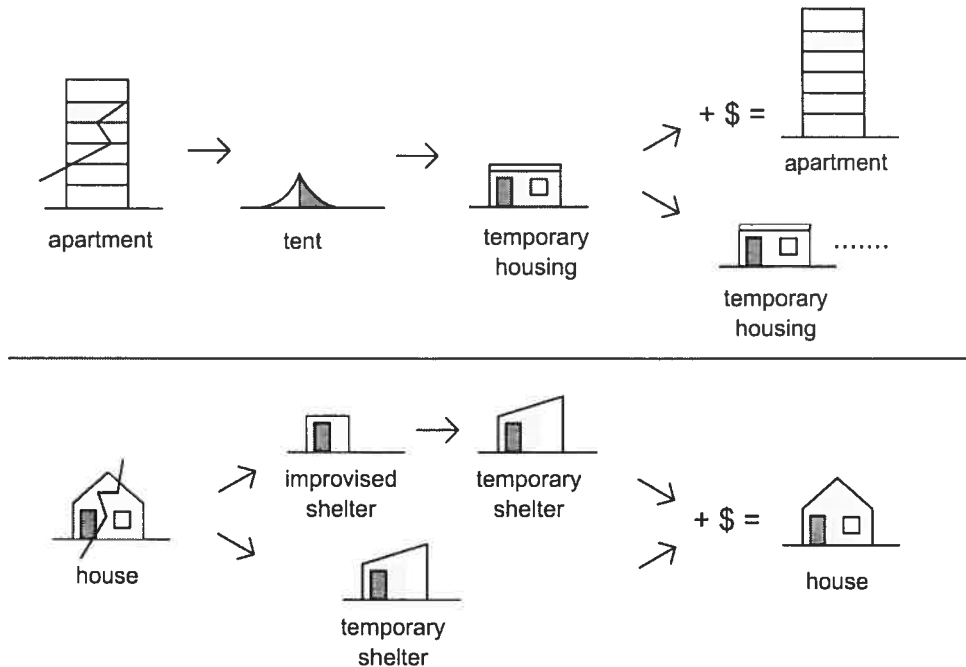
Figure 30 Residents that were homeowners followed different housing steps in each of the projects. Above: the Turkish case, below: the Colombian case.

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 program 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 23 suggests its importance but begs the question of where the impetus comes from. That depends on the socio-political environment.

Article IV: Outcomes of temporary housing projects

Impacts of prefabricated temporary housing after disasters: 1999 earthquakes in Turkey[15]

ABSTRACT

Temporary housing is a crucial but controversial part of disaster recovery; disaster affected families who have lost their homes need a private and secure place to restart their daily activities as soon as possible after the disaster, yet temporary housing programmes tend to be overly expensive, too late and responsible for undesirable long-term impacts on the urban environment. The purpose of this research is to recognize exactly what problems exist with temporary housing in the long-term and to identify, using the systems approach, the origin of these problems within the project process for temporary housing. Using the Logical Framework Approach to highlight the projects' outcomes, the investigation focuses on the case study of the temporary housing programme for the 1999 earthquakes in Turkey and on four temporary housing projects in Düzce, one disaster-affected town. In the long-term, unwanted effects can be reduced through proper facilities management, reuse of the units, and by the initial application of unit designs that are easy to dismantle. Incorporating plans upfront, thus dealing with these problems by anticipation, can minimize negative long-term impacts.

INTRODUCTION

Temporary housing, especially that supplied by governments and international agencies, has been criticized for being unnecessary, too expensive, too late, too long-lasting and drawing resources away from permanent reconstruction (Bolin, 1990; Bolin and Stanford, 1991; Dandoulaki, 1992; Davis, 1978; Geipel, 1991; Gilbert, 2001; Quarantelli, 1982; UNDRO, 1982). However, judging by the frequency of use after recent large-scale disasters[16], the supply of temporary housing units can be essential for quick recovery of the population and to allow time for safe rebuilding. Ideally, after a disaster, temporary housing would be immediately available, offering a level of comfort consistent with the prevailing standard of living, at a cost proportional to intended length of use and easily eradicated or transformed once it is no longer needed; but in reality temporary housing is overly expensive and in the long-term, temporary housing sites can become an environmental blight and a hotbed of social dysfunctions.

After some disasters, families may be temporarily housed in existing but vacant housing or they may be able to shelter themselves. But, many disasters situations create a housing crisis that warrants the authorities to supply temporary housing units. To be successful in terms of recovery, cost effectiveness and environmental concerns, temporary housing programmes must address factors existing in the larger environment, such as local living standards, local industries, local politics and permanent reconstruction programmes, and then plan the individual projects that make up the programmes accordingly.

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[16] In Thailand (2004); Bam, Iran (2003); Izmit, Turkey, (1999); Armenia, Colombia (1999); Kobe, Japan (1995); Florida, United States (1992); Loma Prieta, California, United States (1989); Kalamata, Greece (1986); Mexico City, Mexico (1985); Friuli, Italy (1976); Lice, Turkey (1975); Managua, Nicaragua (1972); Skopje, Macedonia (1963).

Using the case study of the temporary housing programme after the 1999 earthquakes in Turkey, this research looks at four temporary housing projects to identify the *long-term impacts* of the temporary housing programme and to identify the relationships between these impacts and the larger environment, i.e. post-disaster recovery, and the political, economic and social environments. The objective of this research is to highlight factors that affect temporary housing projects in the hopes that the information it yields will lead to more efficient projects in the future.

Temporary housing as part of a system

In order to make some sense of the complexity of factors affecting a programme of temporary housing, we must consider the programme as both a system in itself and as a part of larger systems. As proposed by Hall (1962) a system is a group of elements with relations between them, and relations between them and their environment. The environment of a system is a) all the elements outside the system that affect the system when they are changed and b) affected by a change in the system. A temporary housing programme is a system, which contains many projects as well as its own organisational and technical sub-systems (figure 31). In the environment outside the system of the temporary housing programme are many larger systems, such as the reconstruction programme[17], the programme for overall disaster recovery, and the country's economic and political systems. Each of these larger systems has an impact on the temporary housing programme, and likewise the temporary housing programme could likely have an impact on the larger systems.

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[17] For more information and research about reconstruction programmes see the i-Rec website: www.grif.umontreal.ca/pages/irechomepage.html
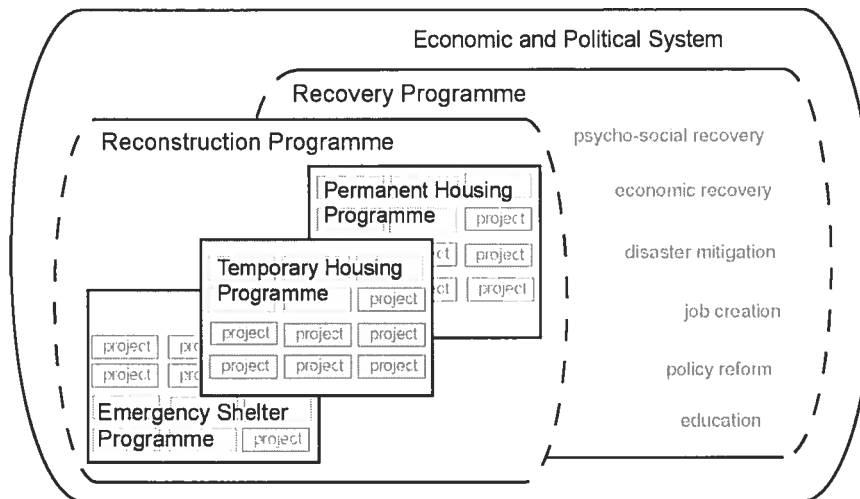
Figure 31 Temporary housing system in its immediate and broader environments

Definitions and problematic of temporary housing

Quarantelli (1995) describes four distinct stages of housing that are used after disasters: (1) *emergency shelter* - used for the height of the emergency, this may be a public shelter, refuge at friend's house, or shelter under a plastic sheet; (2) *temporary shelter* - used for the few weeks following the disaster, this may be a tent or a public mass shelter, and also is accompanied by the provision of food, water and medical treatment; (3) *temporary housing* allows for—in a temporary location—a return to normal daily activities, i.e. work, school, cooking at home, shopping etc.; this can take the form of a rented apartment or a prefabricated home, among other options; (4) *permanent housing* - return to the former home after its reconstruction or settlement in a new permanent home. Those whose homes are affected by a disaster may or may not pass through all of these stages, and many stages may be employed simultaneously by different sectors of the affected population. If permanent housing is available quickly enough, people may pass from temporary shelter directly to permanent housing.

Temporary housing can de defined as a) an object, i.e. the physical structure people inhabit after a disaster; b) a part of a process of re-housing after a disaster, just as Turner (1972) defines housing not as a *product* but as a *process*; c) is a place that serves the function to shelter people during the period from the disaster until they have a permanent place to live. The difference between *temporary housing* and *housing* is that in the former, the duration of tenure is established in advance whereas in the latter tenure is usually for an indeterminate period. In temporary housing, people are only planning to stay there until they can find permanent housing; either the conditions of the temporary house will be found to be less comfortable than the conditions of a permanent house for a given family or the temporary house will only be made available to that family for a predetermined period of time.

Temporary housing can take on different physical forms and in terms of resource expenditure the simplest type of temporary housing is rented apartments. In the situation where there is a supply of vacant apartments available in the disaster area, families often receive rental subsidies from the government. For example, after a flood in the Saguenay region of Quebec, Canada, there was enough vacant rental housing available to temporarily absorb those families whose homes were damaged. Also, if possible, many people will go and stay with relatives close-by. If these two options are not sufficient, some type of temporary housing must be constructed or supplied either through the informal sector by the families themselves or through the formal sector, such as by government, NGOs or aid agencies. It is this latter category of temporary housing supplied and constructed through the formal sector that is the concern of this research.

Many researchers have said that in the developing country context, specifically in tropical countries, temporary housing supplied by the formal sector is often not necessary and should be skipped altogether in favour of

accelerated permanent reconstruction. In these situations, housing is often not the most important need, and other factors such as jobs and access to land may be more vital to recovery (UNDRO, 1982). However, if a disaster occurs that causes a housing crisis in an industrialised nation where standards of living are generally higher and people are not accustomed to providing their own housing, temporary housing cannot be avoided without negative repercussions on society and on its recovery. For example, Comerio (1998) points out that during the Loma Prieta earthquake in 1989 in the United States, housing damage was largely concentrated in multi-family low-income districts and the lack of affordable temporary rental accommodation in the affected areas significantly increased the proportion of homeless people living on the streets. Also, temporary housing will play a more crucial role after disasters that occur in places where there may be climatic risks. In all cases, for the temporary housing programme to succeed—no matter how basic or complex—the technology must be appropriate compared to living standards in the country in question.

MATERIALS AND METHODS

This research employs qualitative case study methodology, adapted from Yin (2003), using a single case study of the *programme* for temporary housing after the 1999 earthquakes in Turkey. Embedded within this case study are four temporary housing *projects* in Düzce, one of the Turkish cities affected by the earthquake. In this context, and as defined by the International Labour Office (ILO), "a *programme* is composed of several *projects* that are linked to the achievement of higher objectives" (ILO, 1996, p.26). A *project* is defined as a unique operation that has a start, a finish, a limited duration and a defined objective (Davidson, 1998). The projects were selected for their differences in terms of size, location, type of unit, and donor organisation, so as to observe their individual outcomes and to observe patterns across the projects. The findings from this Turkish case study are then complimented by

findings from other published case studies about temporary housing to propose analytic generalizations.

Data collection occurred over three separate field trips to the disaster-affected areas of Turkey in June 2000, November 2003 and from May to August 2004. For the overall temporary housing *programme*, the data were collected using interviews with key personnel within the Ministry of Public Works who were responsible for the temporary housing programme and with researchers working on disaster management in Turkey; from reports by the World Bank and other development agencies; and from internal governmental evaluation reports. Data were collected at the *project* level through interviews with local project managers, municipal officials, community leaders, and from former and current residents as well as through direct site observations.

The Logical Framework Approach, or *logframe* is usually employed to describe the process by which projects are produced, including the cause-effect time sequence between the projects' stages. However, here this research constructs the logframe from the "top-down"—looking first at the long-term impacts of the project, then the short-term results and finally tracing back to the project processes (outputs and inputs). Normally in project planning or project monitoring, the logframe traces steps from the "bottom-up"—beginning at the inputs stage and going up the ladder to where the project is completed and the final results are apparent at the impacts stage. For evaluation, there are some problems with using the logframe in this way because it does not allow the evaluator to become cognizant of unexpected results or impacts (for a discussion of this see Gasper, 2000). To avoid these problems with evaluation, a variant approach is used, which works best from the top-down (figure 32).
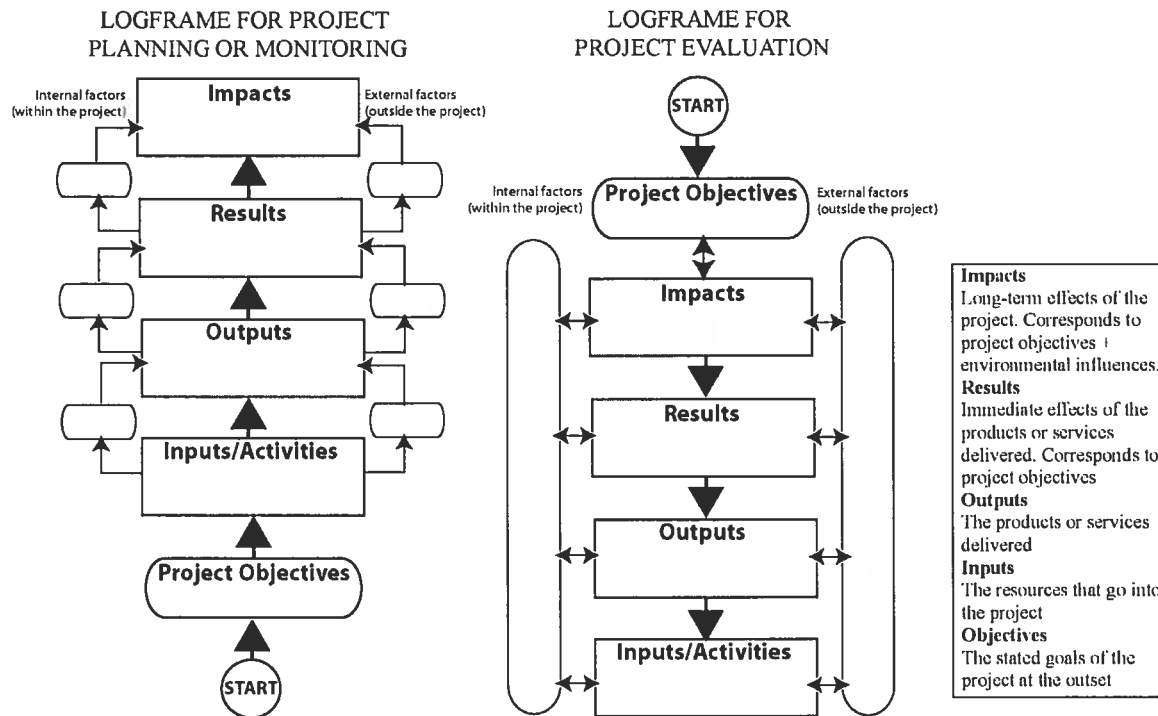
Figure 32 The standard logframe method used for project planning and monitoring (left) and the "reverse" logframe method adapted for the project evaluations (right).

The long-term impacts of the projects were assessed in the summer of 2004, approximately 4.5 years after the projects were built. This included accounting for the physical state of the houses and the site; determining who was living there; explaining dismantling procedures; and assessing the projects' impacts on the housing market and development in the selected region. The short-term results, i.e. the effects of the projects when they were first built, were established from prior field visits in 2000, as well as from interview data in 2003 and 2004. The projects' process (inputs and outputs) was reconstituted using information from project documents and interviews. The next step was to understand whether the final impacts of the project were related to the system of the project (internal factors) or to systems outside the project (external factors). To do this, the impacts of the project were traced back to see if they resulted from one or more of the inputs/outputs/results

levels or from factors outside of the project. The results of these methods are reported below in the case reports.

CASE REPORTS

Programme for temporary housing

At the time of the earthquake (table III), the then-current Disasters Law stipulated that the government was responsible for providing a home for each family affected by the earthquake[18] (Gülkan, 2001). The government was certain that some of type of permanent housing reconstruction would be needed and an appeal was launched to the World Bank to secure funds for this project. In the meantime, the government decided to implement a programme for temporary housing to house the people who were living in tents and tent camps in the affected areas. For those families who could find an apartment to rent, the government gave rental allowances for two years. For the rest of the families, the government built prefabricated temporary housing on vacant land in and around the cities.

Table III Earthquake data

Earthquake date	17 August 1999 03:02	12 November 1999 18:57
Magnitude	M7.4	M7.2
Towns heavily affected	Izmit, Gölcük, Yalova, Adapazari, eastern Istanbul	Düzce, Bolu
Housing Damage	311 693 housing units affected (113 382 light damage, 104 693 medium damage, 93 618 heavy damage/collapsed)	
Households homeless	1 out of 3	

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[18] As of September 2000 this is no longer true. Each homeowner must now join the mandatory insurance scheme of the Turkish Catastrophic Insurance Pool (TCIP) and urban dwellers no longer qualify for automatic assistance after a disaster.

The decision to build the prefabricated units was made based on an assessment of the situation: there were between 180,000 and 240,000 people living in tents and winter was fast approaching. Furthermore, due to the proportion of buildings damaged and the tight rental market even before the disaster, there were few possibilities for finding suitable rental accommodation in the area. Economically, the affected region was home to key manufacturing industries and therefore was of strategic importance to the country's economy. Also, the existence of a developed and influential prefabricated building industry in Turkey meant that companies could supply the prefabricated buildings in a timely manner whereas permanent housing could take many months. Moreover—politically—the provision of temporary housing cast the government in a popular light for its effort to make necessary investments in the devastated area.

Initially there was much debate in the media and among civil society over the construction of temporary housing units in the earthquake area (Cam, 2000). Even before construction started, the project was criticized for siphoning resources away 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 construct 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.

The temporary housing programme was managed by the MPWS, which collaborated with local governments and related government ministries for land supply and infrastructure installations. The programme was decided upon in the few weeks following the first earthquake and, as mentioned, a call for tenders was put out within a month. The MPWS set the price at US$3,300 for a 30m^2 prefabricated duplex unit, totalling around US$5000 per unit inclusive of infrastructure costs. In total 40 621 temporary housing units were built throughout the affected region in 136 settlements between Dec 1999 and June 2000 with a 97.5% rate of occupancy. Out of the total, 31 339 were built by the MPWS in 53 settlements; NGOs and foreign governments built 9 282 units in 84 settlements through funds or in-kind donations.

For the projects built by the MPWS, site selection was a collaborative effort between the MPWS and the local governments. The Ministry of Transportation and the State Electric and State Water companies undertook the work to supply the utilities and prepare the land. Prefabricated building manufacturers in the private sector supplied and constructed the units.

The projects that were built by the NGOs were organized differently depending on the specific project; however in most cases, land with the entire infrastructure installed was supplied to the NGOs by the MPWS using the same system as described above. For the NGO projects, the units themselves were imported from the donor country, purchased from local manufacturers, or built using local materials and labour, depending on the specifications of the project. In total, the government expenditure for the temporary housing programme was US$122 million not including donations from the NGOs (World Bank, 1999).

Where possible, the projects occupied vacant government land in and close to the cities. The settlements ranged from 20 units to 2000 units and contained different types of services depending on the size and the proximity to other services. The majority of the large developments were on the outskirts of the cities and because of the distance included schools, clinics, daycare centres and all the necessary services for a functioning community.

Beginning about two years after the earthquakes, permanent houses were ready for those families who were homeowners before the earthquakes and had lost their dwelling. The World Bank and the MPWS built new settlements of three to five storey apartment blocks on parcels of land on the hills surrounding the cities. Homeowners who qualified for the programme were given low-interest loans and took up residence in the new settlements, vacating the temporary housing. Families who rented apartments before the earthquake were left with few options as the majority of the rental stock had been destroyed in the earthquake driving up prices for the remaining units. Many of them stayed behind in temporary housing or have become involved in small NGO housing projects.

Projects for temporary housing in Düzce

Düzce is a province with a population over 300 000 located approximately half way between Istanbul and Ankara in the mountainous region of Bolu. Economically, Düzce is mostly dependant on forestry, hazelnut farming and small manufacturing. The city proper serves as an economic centre for the many small villages dotted in the surrounding mountains. Between 1980 and 1998 unplanned housing developments proliferated to meet the demand of in-migrants attracted to the growth of industry. Both 1999 earthquakes affected Düzce, although the second earthquake did the most damage in the area. In total, 980 people were killed and over 29,0000 houses were destroyed or badly damaged.

For this study, four temporary housing projects in Düzce were chosen, two that were built by the government—Kiremit Ocagi and Gümüspinar—and two that were built by NGOs—Fidanlik and UMCOR. The information presented in the project reports below was collected over a period of field visits between 2000 and 2004, the last of which was in August 2004. Therefore, the observations about the conditions of the temporary housing projects were current as of the last field visit in August 2004. For each case the project process and outcomes were documented; the results of this are presented as logframe diagrams and photos in the following figures.

Project 1: Government, Kiremit Ocagi

After Düzce sustained some damage in the first earthquake, the MPWS planned to build a 200-unit settlement, Kiremit Ocagi, to house those whose homes were damaged (figure 33). The settlement was located on a parcel of government-owned vacant land within the city, next to the river. After the second earthquake, the demand for temporary houses greatly expanded and the authorities changed the settlement plans to maximize the density, building a total of 330 units. The houses were 36m^2 duplex units built with prefabricated pressed board panels on a concrete slab foundation and included plumbing and electricity. Since the settlement was within walking distance of services in town no school, medical centre nor mosque were provided but there were some community services such as a small market, a cafeteria, laundry facilities, an embroidery workshop and a playground.

This settlement has been continuously occupied since it was constructed and, at the time data collection, all the units were still occupied. A small part of the settlement (approx. 30 houses) is located on the other side of the river and is occupied by the local gypsy population. The main part of the settlement is occupied by families affected by the disaster who either do not have homes to

return to or are afraid of returning to their homes for fear of another earthquake. Few alterations have been made to the units, except for vegetable and flower gardens installed outside the units. The community leader, the *muhtar*, who is hired by the local governor's office, is very active in maintaining the community and ensuring tenants are paying rent; his involvement has ensured the settlement has not been dismantled. Although it will be difficult to evict all these tenants, especially the gypsy population, the muhtar indicated that it is likely that the settlement will be dismantled in the future.
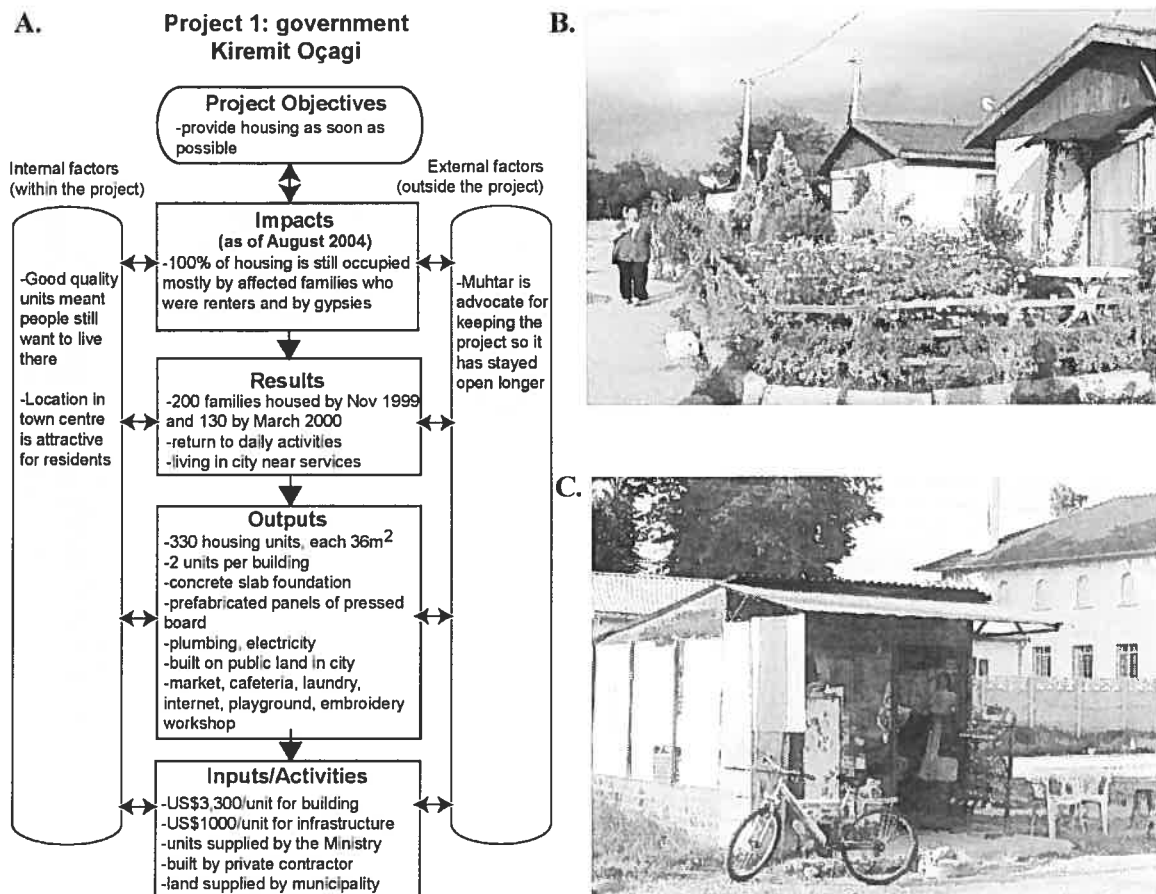
Figure 33 Kiremit Ocagi temporary housing project; A. Logframe diagram; B. Housing units and gardens; C. A small market in the settlement.

Project 2: Government, Gümüspinar

Gümüspinar, built in response to the second earthquake, is a large settlement of 1194 units located on government-owned land about 5 km from the city (figure 34). This was one of two large settlements outside of the city that housed families from Düzce and also from the surrounding countryside. The Ministry of Transportation owned the land and before the earthquake it was designated to become an airstrip. Preparation of the site included grading, raising the building plots, laying gravel and constructing roads and curbs. Duplex units of 30m², prefabricated panels with corrugated metal exterior walls were built on concrete slab foundations and included electricity and water. Since the settlement was outside of the city the services included a school, a mosque, and medical clinic, coffee shop, laundry, Internet café and community centre as well as bus, postal and garbage collection services.

For the first two years the settlement was completely occupied; however, many of the tenants have now moved into permanent housing leaving only 20% of the units occupied and the settlement in a state of disrepair. Even families affected by the earthquake who were not homeowners were able to vacate this settlement 3 to 4 years after the earthquake for self-help permanent housing projects that were sponsored by NGOs. About 600 units have been dismantled, most of which have been sold to families for about $1100 each-leaving the foundations, toilet fixtures and garbage strewn about the site. Of the 150 families who remain in the units, most were not directly affected by the earthquakes, but have taken up residence there because of cheap (or free) accommodations, despite the desolate environmental quality and distance from the city.

The government plans to force out the remaining families by cutting off water, electricity supply and garbage collection services and then dismantle the rest of the site. Units that cannot be sold will either be recycled for future disasters

or junked, depending on their physical state. In Gümüspinar, like in Şiralık, the other large settlement outside the city, and other settlements in the disaster area, it is probable that the concrete slab foundations and the underground infrastructure will remain on the site long after dismantling has occurred. Since these settlements are on government owned land and there are no immediate plans for redevelopment, the sites remain in a sorry state long after the temporary housing is gone.
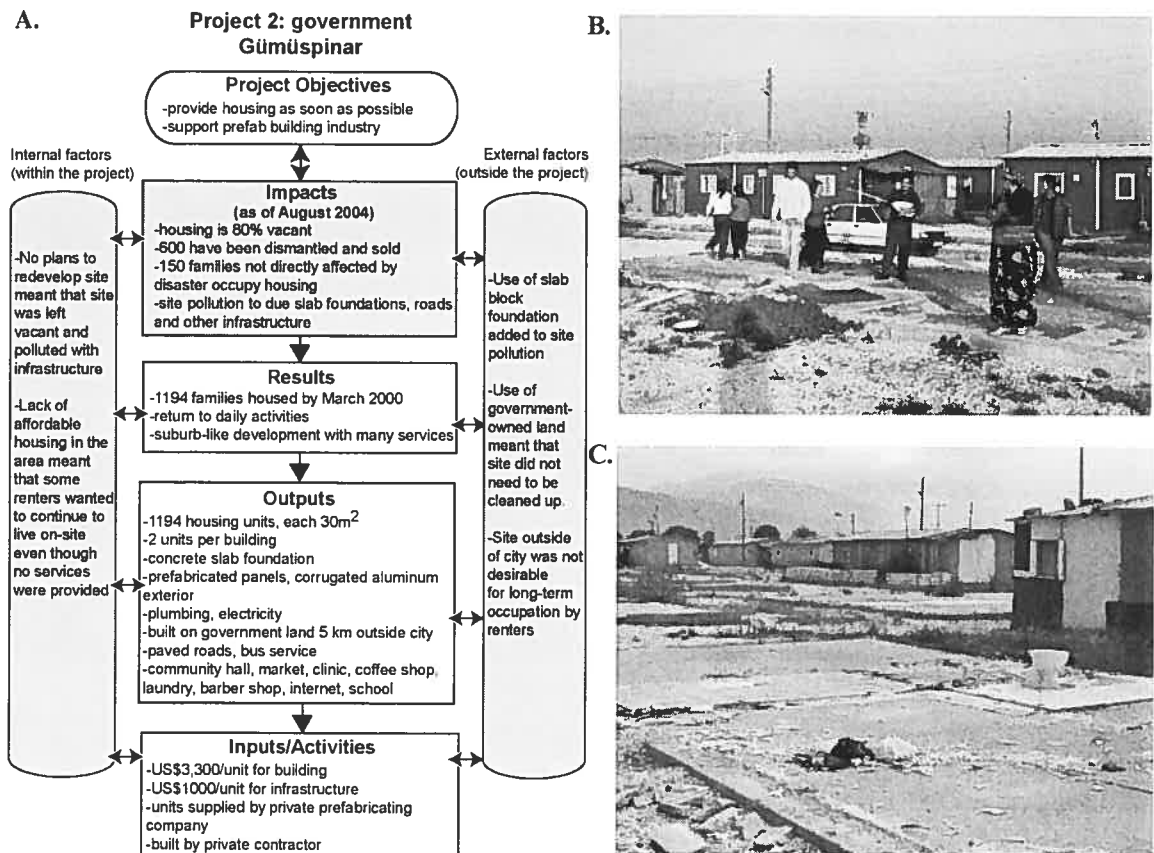
Figure 34 Gümüspinar temporary housing project; A. Logframe diagram; B. The project in 2003; C. Project in 2004 with the slab foundations left on the site of the dismantled houses.

Project 3: NGO, Fidanlik

Two days after the second earthquake in Düzce, the Turkish NGO consortium, Afete Karsi Sivil Koordinasyon - Civil Coordination Against Disasters (ASK) launched an Internet appeal to raise funds to build a temporary housing settlement in Düzce (figure 35). This appeal was answered by an NGO, Action by Churches Together (ACT) Netherlands, which offered to sponsor the project. The MPWS and the municipality offered a government-owned site within the city for the project and included the installation of infrastructure. ASK in cooperation with ACT Netherlands found a local builder to supply and build the units; in total 352 units, 23m^2 each with four units per building were built of wood on pile foundations. Each unit was one room with a kitchen area and a small bathroom with running water. The settlement, although located close to the city, also included laundry facilities, a library, a youth centre, a daycare and a coffee shop built by the NGOs and managed by the residents. In the early stages, the whole settlement was run by the community themselves, however, later the management was transferred to the governor's office.

Fidanlik was completely dismantled in July 2004 after several of the units succumbed to fire. Prior to dismantling, a few families were camping-out in the units but were forced to leave when the government cut off the water and electricity. The wood material was recycled into wood chips and the rest of the land and debris was cleared except for the underground infrastructure. Redevelopment of this land is likely considering its location near the city; prior to its use as a site for temporary housing, this area was used as a plant nursery by the state.
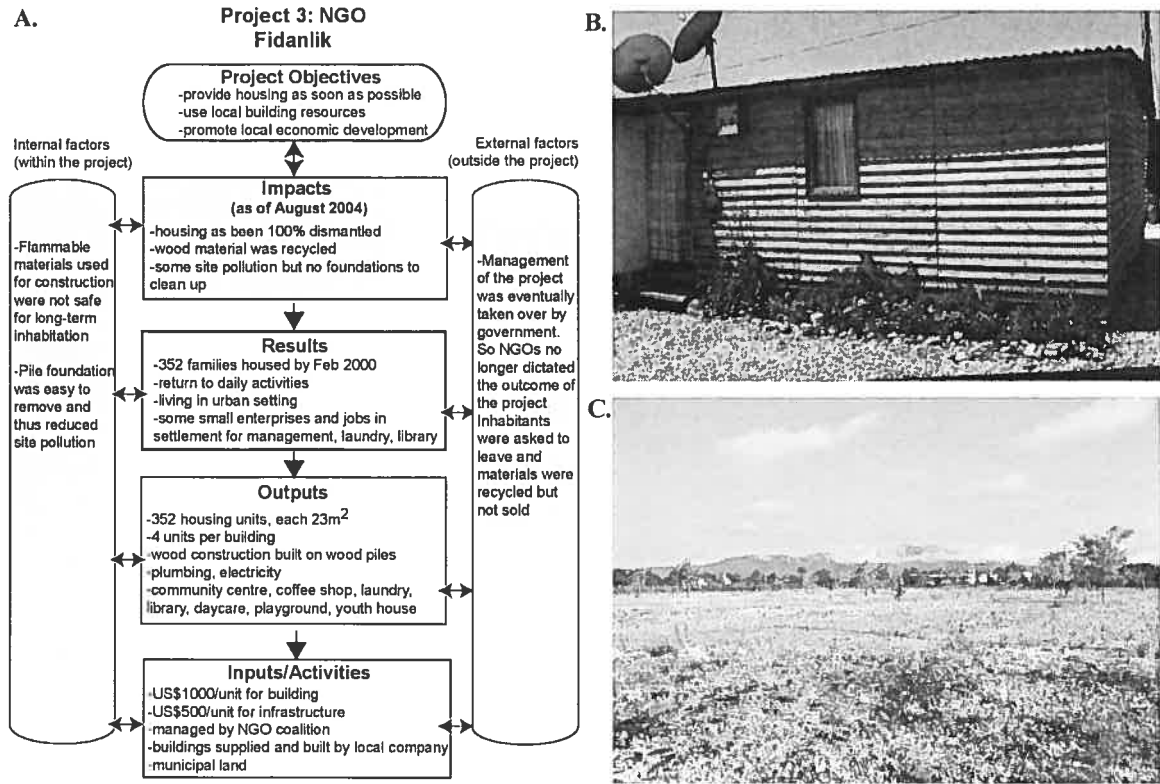
Figure 35 Fidanlik temporary housing project; A. Logframe diagram; B. Housing unit, photo taken in June 2000 a few months after it was built; C. The site after dismantling in July 2004 has very little pollution.

Project 4: NGO, UMCOR

UMCOR (United Methodist Committee on Relief) funded a temporary housing project that was coordinated by a local NGO, Human Settlements Association (HSA) (figure 36). The project got underway later than most of the temporary housing and it was completed in May/June 2000, about 10 months after the earthquake. The government offered a site for the project outside of the city, but this was rejected by the NGOs who then went ahead and negotiated contracts for several privately-owned plots inside the city. As a trade for the use of the land, the NGO offered eight finished housing units to the landowner. Like the other projects, the infrastructure was still provided by the

state. In total, 192 housing units of 25m^2 were built in 8-unit buildings. The buildings were prefabricated panels built on steel frames and metal piles.

Out of the total number, 136 units were still located on the site as of August 2004. The families living in the units were paying rent and many of them were young families who were living with their parents prior to and after the earthquake. The availability of this affordable housing has allowed them move out on their own. Some of the tenants have removed one of the dividing walls and occupy two units, totalling 50m^2.

One of the specific objectives of the units' design was that the units could be moved and reused. The lease for the land is terminated in July 2005, which is five years after the date of construction, so all the units must be moved or dismantled by that date. In July 2004, 7 buildings (or 56 units) had been dismantled and moved to new sites in the area for use as schools, community centres and medical clinics. The buildings were donated to the new owners, but the cost of moving each building and reinstalling it was estimated to be about $5000 per building.

A.

Project 4: NGO
UMCOR

Project Objectives
-provide housing as soon as possible
-reusable building system
-inner city location

Internal factors
(within the project)

External factors
(outside the project)

Impacts
(as of August 2004)
-136 units still occupied mostly by young families. Some families occupy 2 units and remove the walls
-56 units (7 buildings) dismantled, reconstructed in new locations as new fuctions: school, community centre, civic buildings, etc.
-all units to be dismantled by spring 2005 when lease for land expires

-Reuse was acheiveable partly because design was intended for this

-Private land ownership meant units must be removed and land cleaned by end of lease

-For reuse to be possible, there must be a market that is willing to pay moving costs for the units

Results
-392 families housed in July 2000
-return to daily activities
-living in urban setting

Outputs
-192 housing units, each 25m^2
-8 units per building
-prefabricated panels built on steel frame and metal piles
-plumbing, electricity
-no services

Inputs/Activities
-US$3,030/unit for building
-US$500/unit for infrastructure
-managed by UMCOR/HSA NGOs
-built by private company: TRESAN
-priavtely owned land, contract signed for 5 years

B.

C.

Figure 36 UMCOR temporary housing project; A. Logframe diagram; B. The housing units; C. The units reused as a school

DISCUSSION

Based on the data collected, and the process of filtering the data through the "reversed" logframes, the project reports point to general issues about the long-term impacts of temporary housing: the outcomes of the units in the long-term, resultant site pollution, matching design to local resources, and noteworthy differences between government and NGO sponsored projects. The following discussion synthesizes these issues and adds remarks from other case studies where similar temporary housing programmes were implemented after disasters.

Outcomes of the temporary housing units in the long-term

In each of the projects, the physical structure of the temporary houses was still functional long after their intended use. After two to three years, the majority of the temporary units were vacant because the "homeowner" families had moved into permanent housing, leaving mostly the "renting" families and new in-migrants living in the temporary housing. The intention of the programme was to house people until permanent housing stocks could be rebuilt, but at this point in time, many of the temporary housing units were still usable. The quandary is that to make the house comfortable enough to be acceptable as a temporary house often means supplying a structure that is durable well beyond the short time period that it is needed as temporary housing.

This then raises the following question, what can be done with the temporary houses once they are no longer needed for temporary housing? Based on the Turkish case study and results from other case studies, there seem to be basically five options: long-term use, dismantling and storage, sale, demolish, and reuse.

Long-term use of temporary housing is a theme that runs through many case studies and it is often considered by the authorities to be problematic. In Colombia after the earthquake in 1999, the authorities did not manage to evict all the settlers and the situation in the remaining temporary housing settlements is one of social dysfunction and extremely high crime rates (Lizarralde and Johnson, 2003). In Japan, after the 1995 earthquake in Kobe, the population that was left behind in the temporary housing were generally the elderly and poor families who could not afford to purchase permanent housing. There was a problem with high suicide rates in these communities attributed to loneliness and despair from being cut off from their old communities (Comerio, 1998; Tomioka, 1997). Temporary housing in Italy

after the Friuli earthquake in 1976 and in Greece after the Kalamata earthquake in 1986 remained over the long-term because residents persisted in using the units as storage and second homes even once they had permanent housing (Dandoulaki, 1992;Geipel, 1991).

In Turkey, as we saw in the case reports, housing is still in short supply in the earthquake-affected area, especially for renters who were left out of the permanent housing programme. Therefore, there is still a strong demand for long-term use of temporary housing, especially those of good quality that are well located within the city centre. While there is a strong potential for long-term use by renters, the authorities have not been in favour of this because of the management problems it entails, i.e. collecting rents, maintaining units, sites and land leases, and because the infrastructure is not made to last beyond five years. Also, the government is not enthusiastic about sponsoring new migrants who are squatting in the houses without paying rent. With a few exceptions, the government has been successful in forcing people to vacate the temporary housing, avoiding long-term use of the units beyond five years, however structurally sound they may still be.

Long-term options for temporary housing programmes also include *dismantling units and storing them* for use in future disasters. In Turkey, the MPWS has a large storage and restoration facility in Ankara for temporary housing; many of the container-type units were brought there for refurbishment and reuse in the next disaster or to be donated for earthquakes in other countries. In the United States, temporary housing provided by the government is in the form of trailer homes that are recuperated after use, refurbished and stored for the next disaster. However, the cost of refurbishment and storage is not always economical since transport, refurbishment and storage may cost as much as a new unit. For example in Greece, after the Kalamata earthquake, one of the justifications for the use of temporary housing was that after its first use it could be stored for future

uses; however the poor condition of the houses after the first use and the costs of storage made this prohibitive (Dandoulaki, 1992).

Authorities also *sell the units or parts* once they are no longer needed, thus recovering some of the cost. In Turkey, many of the government owned units were sold to families, businesses and institutions for approximately US$1200 each, thus recouping one third of the $3300 initial unit cost.

Even when units are *demolished*, the parts and materials can be sold or donated. The NGO who sponsored the Fidanlik project was planning to sell the materials from the demolished units and use the funds for a community project. However upon demolition, this did not happen because the government had taken over management of the settlement and also the final condition of the units had little value. When the temporary houses were demolished in Colombia after the 1999 earthquake, there was unfortunately no policy mechanism for donating or selling the materials, so the authorities had to dispose of them (Lizarralde and Johnson, 2003).

Reuse of the units for other community functions was undertaken in the UMCOR project where the units were donated to schools, community centres and hospitals for their "second lifespan". At the outset of the project, UMCOR's objective was to design a unit that would be easy to dismantle and reuse. However, at the reuse stage there were also new costs because, while the building is free of charge for the new owner, it must be dismantled, transported and reassembled in the new location. For example in Düzce, the cost to move one 200m^2 building (8 units) to a nearby community for use as a sports centre was US$8000, which included transport and labour, installation of electricity and water, and a new roof. It follows that for reuse to be a feasible option, a market must exist that is willing to pay for the costs of the new installation.

Site pollution

In Turkey, even once the houses were removed from the site, the land remained littered with the infrastructure, concrete slab foundations and other debris. Land under private ownership, for which the government had signed lease contracts, had to be cleared and restored to its former condition. However, since the majority of the settlements were on government owned land there was no obligation to restore the original condition of the site and therefore most sites were left polluted. Observations indicated that concrete slab foundations were the worst pollutants, and settlements that did not use this type of foundation but instead used pile foundations were generally less polluted. In Colombia after the 1999 earthquake, temporary housing units made of wood with pile foundations were built in public parks and playing fields. Since stipulation in the lease meant that land had to be vacated within three years, the programme was successful in cleaning up the sites and removing all the infrastructure and debris (Lizarralde and Johnson, 2003).

Matching design to local resources

The entire temporary housing programme in Turkey used factory-made prefabricated panels and components that were bought locally from local manufacturers. This decision allowed the government to provide much needed temporary housing and also to support the prefabricating industries in Turkey. In fact, it was said that the decision to provide temporary housing was in part a response to a request from the prefabricating industry. Japan, which also has a prefabricated housing industry, has used similar tactics to develop rapidly available temporary housing drawing on local industries. However after the Kobe earthquake, so many houses were needed that they had to purchase some units from international suppliers (Maki, *et al.*, 1995). Wood houses have been used in some cases also drawing on the resources

available in the particular region, such as in Colombia and in parts of Turkey. Whatever the type of temporary housing, most importantly, it must be rapidly available and then secondly, draw on local resources and industries. In Greece after the Kalamata earthquakes, for example, the prefabricated temporary houses were purchased internationally and delays in the delivery meant that temporary housing was not available until after it was no longer needed (Dandoulaki, 1992).

Differences between government and NGO sponsored projects

The temporary housing projects in Turkey also reveal some differences between NGO sponsored projects and those that were sponsored by the government. In general, NGO projects were smaller in terms of the number of units, ranging from 20 to 350 units whereas the government projects were up to 2000 units per settlement. In the NGO projects, the house designs, the materials and the quality varied from project to project, depending on the specifications set by the organisation. While most units had a kitchen and bathroom, some projects were more rudimentary and did not include these facilities; meanwhile, other projects offered more deluxe accommodations with closed bedrooms and washing machines. These differences resulted in some large variations in comfort from one project to another. Designs in the government projects were more or less the same, since the prefabricating suppliers responded to a call for tenders in which design specifications were pre-established by the government. Government projects were built on government-owned land whereas the NGO projects were built both on privately owned land and on government-owned land.

There also appeared to be differences in the objectives of the NGO and government projects. The government projects aimed to build a large number of units in as short amount of time as possible—and they were very successful in achieving this goal. Generally it seems that the NGO projects

placed more importance on sensitivity to local needs, such as using local resources, creating income opportunities for the dwellers, reuse of buildings for community purposes, and placing maintenance responsibility in the hands of the people rather than the authorities.

CONCLUSION

As this research has tried to demonstrate, the factors that affect the temporary housing programme come both from the system of temporary housing and also from larger systems outside the temporary housing. For example, the temporary housing programme forms only a part of the total programme for recovery, so its organisational and technological designs must fit with, and contribute to, the recovery programme as a whole. Furthermore, the type of temporary housing supplied, i.e. prefabricated units, or self built units, will depend on larger economic and political factors in the country and even internationally. A summary of these factors is presented below:

- **Rapidly available:** Most importantly, temporary housing must be rapidly available for the affected population. For this to happen, the financial and organisational resources must be in place before the disaster occurs to swiftly instigate the temporary housing programme, and a supply of units must be available.

- **Draw on local suppliers and/or local resources:** the temporary housing programme can promote national or local manufacturers and suppliers as well as the economy by using domestically produced products, services and labour.

- **Meet local living standards in terms of comfort, services and location:** Living standards in one disaster-affected area are different from the living standards in another; therefore the design, services and locations used for the temporary housing should reflect local living standards rather than living standards of the donor country.

- **Designing for the length of time temporary housing is needed or an efficient long-term plan for the units:** In Turkey, as in many other cases, the units were made to last much longer than they were needed as temporary housing. At the same time, renters were in need of housing, yet they because of the management structure they were not allowed to stay in the temporary housing. This created a mismatch of resources.

  The length of time temporary housing is needed will depend upon the timing of the permanent reconstruction programme and must reflect who is included in this programme. Either units can be inexpensive and designed to be durable only for a short period of time, or a programme of reuse can be planned.

- **Easy to remove and non-polluting:** Land leases for temporary housing projects can stipulate that the sites must be cleaned and returned to their original condition before the end of the lease. Infrastructure, units and foundations that are simple to remove will likely leave the site less littered.

If the above mentioned factors can be addressed at the outset of the programme, then the negative impacts associated with temporary housing, i.e. too late, too expensive, too long-lasting can certainly be reduced to the point where temporary housing becomes an efficient and practical way to house people quickly and temporarily after a disaster.

The case reports and the discussion highlight the long-term outcomes of temporary housing and point to factors that need to be addressed in the initial planning of temporary housing programmes. In the Turkish case, the disaster-affected people welcomed the use of prefabricated temporary housing, and it could be argued that it was necessary to implement this programme to aid recovery quickly enough. Despite the relative success of the programme in the short-term, assessed in terms of the timely supply of units and the very high occupancy rates, the negative long-term outcomes addressed in this

research might not have been problematic had they been addressed at the outset of the programme.

CHAPTER 5: GENERAL DISCUSSION

The following discussion synthesizes the research findings. Two kinds of information are presented here: 1) points that have already been expressed elsewhere in the text, for which it is necessary to restate their importance in the overall findings of the research and 2) new points that were not presented in the articles because they have emerged during the general synthesis. If a point has already been expressed in one of the articles, a reference will be provided, indicating its location.

Section 5.1 defines thirteen points of synthesis and section 5.2 offers recommendations for each stage of the temporary housing project lifecycle.

5.1 Synthesis of the findings

This research is set apart from most studies in reconstruction in that it recognises temporary housing as a process in its own right, differentiated from other parts of housing recovery, and therefore subject to its own constraints and issues. It is these constraints and issues, specific to the system of temporary housing, which constitute the main findings of this research:

1.

Temporary housing is both a physical product and a stage of housing recovery after a disaster. Due to a lack of strategic planning, the process of providing temporary housing has been fraught with problems. A systems view of temporary housing is necessary to understand how to make improvements.

Temporary housing is both a *product*, that is, an actual inventory of housing stock provided to house affected families temporarily after a disaster, and a *stage of recovery* where families to get back to their daily life in a dwelling

that serves them until they have a permanent place to live (see Article IV, Introduction). The former part of this definition, that is, the physical product of temporary housing, is the main focus of this research. Decisions that are made regarding the physical form of temporary housing units and communities, and how they are planned for and managed have an impact not only on the affected population's recovery, but also on the long-term overall reconstruction and on urban development patterns.

Many problems in previous temporary housing projects have come about because of the need to make quick decisions following the disaster and the consequent lack of time to create a well thought out plan. Problems include: too many houses built, houses not suitable for climate and/or culture, houses extremely inconveniently located, or houses unexpectedly becoming permanent. Overall this means that resources are being wasted, or families are going without adequate housing.

This research puts forth that *pre-disaster strategic planning, which utilizes the systems view, is required to improve the application of temporary housing.* Untangling the diverse problems of temporary housing calls for a systems perspective, which sees temporary housing as part of a larger system of post disaster reconstruction and also part of the overall disaster recovery (see Article IV, Introduction). These systems are in turn embedded in larger systems such as local economic, political and social systems, in local precedents for building, and even in international systems of aid, foreign lending and donations. On the more specific side of project management however, strategic planning for temporary housing also encompasses the following sub-systems:

- An organisational system: a programme for temporary housing is born out of a complex array of organisational systems that must work together in a

chaotic post-disaster environment to produce a coherent and efficient plan;

- A technical system: a choice of building type and design, and urban design that meets all the necessary climatic, cultural and time requirements;

- A systemic process: matching the type of technical solution required with the numbers of houses needed, finding adequate locations, procuring and distributing houses, managing the settlements and dismantling the houses.

2.

Temporary housing programmes are strongly influenced by country specific precedents in building and, more broadly, organisational culture.

The international cross-case nature of this research has shown that procurement strategies for temporary housing in different countries are strongly related to that country's habitual organisation of building projects, to the technical training and expertise that already exists, to local ideological traditions and to existing industries.

For example, in Turkey, the ministry responsible for temporary housing (and reconstruction), also administers public housing projects (called mass housing in Turkey). Therefore many existing arrangements for permanent infrastructure construction and project management could be drawn on for the temporary housing projects. The entire programme was highly centralised in the government and, as had been the precedent set in past disasters, there was a high level of expectation that the government take responsibility for procuring new houses. We can compare this to the temporary housing

project in Colombia, in which the reconstruction was decentralised and handled by locally based NGOs and by the people—a decentralisation done to avoid corruption at the government level. It reflects the culture of building in which the responsibility for housing lies more on community-level procurement rather than centralised government procurement.

3.

Political goals and motivations are likely to shape decisions regarding temporary housing.

This research has shown that many of the decisions made regarding temporary housing, i.e. whether to provide it, who supplies it, who it will be provided to, where it will be located, how fast it will be available and for how long, are decisions that, in many cases, are made to achieve some political goals, whether implicit or explicit. Table IV shows the organisations that influenced the *initial* decision about providing temporary housing.

Table IV Organisations influencing decisions about temporary housing programmes, by case study

ORGANISATIONS INFLUENCING DECISIONS ABOUT TEMPORARY HOUSING PROGRAMMES	Turkey (1999)	Colombia (1999)	Japan (1995)	Greece (1986)	Mexico (1985)	Italy (1976)
Affected Community		▨			▨	
Community-based Organisations						
NGOs & Aid Organisations		▨				
Municipal & Regional Authorities	▨		▨	▨	▨	▨
Central Government*	▨	▨			▨	▨
Building Industry	▨					
Land Owners						
Banks & Lending Institutions						

*most often a special body created within the government for relief & reconstruction

▨ strong influence
☐ lesser influence

Most frequently it is the government, either the central government or the municipal or regional authorities, which are responsible for decisions regarding the temporary housing programmes. The central government will often appoint a temporary body responsible for the reconstruction and relief efforts, if it does not already exist permanently. However, these bodies, both central and regional/local have been known to sway their decision to favour a certain group. In Turkey, it appears that the prefabricated building industry had an impact on the decision to construct prefabricated temporary housing units. In Mexico following the 1985 earthquake, Comerio (1998) pointed out that the decision to have temporary housing units built conveniently alongside the damaged buildings was politically motivated because the affected population had a large voting power that could upset the government if they were not provided with decent solutions. In Colombia, to avoid corruption, this central government body delegated responsibilities to locally based NGOs, which were believed to be less corrupt. In Italy, it appeared that many of the decisions regarding the temporary housing programme had been corrupt (Geipel, 1982).

4.

Temporary housing is provided after a disaster for the purpose of: aiding family recovery, allowing time for sustainable redevelopment, maintaining economic functioning in a region, and public health.

The main reasons for providing temporary housing are:

1) *Humanitarian-related:* Offering families decent housing to help them recover and to allow them time to figure out how they are going to rebuild their homes or gain access to permanent housing adapted to their needs.

2) *Development-related:* Allowing proper time to get systems in place that will promote safe rebuilding in the area. This may include:

- Taking time to plan the location of reconstructed houses and ensure compatibility with the overall programme for reconstruction;

- Using participatory methods for planning the reconstruction and future developments in the area. It is considered the best practice for achieving sustainable development; however to reach a consensus through participatory methods often takes time;

- Creating a new urban or regional plan for reconstruction and future development that will make the area safer from future disasters;

- Updating building practices and land supply mechanisms so that new buildings are more likely to conform to building codes. This entails passing new policies or adopting new codes, implementing new practices (including code enforcement) and developing information management systems and educating building industry professionals (and the general population) about disaster resistant technologies, methods and procedures.

3) *Economic:* Maintaining the population in a given area, or encouraging the return of a population that fled elsewhere after the disaster, to promote economic regeneration or to sustain the existing economy in the region. If people leave a disaster-affected area the economy will collapse; a good example of this is New Orleans after hurricane Katrina. The city could not function again until the residents came back to live there—but in order to do this they need safe housing.

4) *Public health-related:* To control disease outbreaks and other sicknesses and to facilitate the provision of other social services.

5.

The physical type of temporary housing chosen will depend upon: availability of existing undamaged housing, country-specific precedents in building, climate, living standards in the disaster area, willingness to invest, politics (interest in supporting certain groups), supply of building materials and the length of time temporary housing will be needed.

As explained in Article I and in the discussion of Article II, temporary housing can take on many different physical forms or types, which vary by the level of comfort provided, by the procurement method, by the time it takes, and by the intensity of investment. Organisations responsible for temporary housing have to make choices about what type of temporary housing to invest in; this decision must weigh in many factors, such as:

- Availability of existing undamaged housing: if apartments or other housing options exist there is no need to build special temporary housing units
- Country-specific precedents in building: normal procurement methods and building typologies
- Climate: the design needs to consider local climatic conditions and other risks
- Living standards in the disaster area: types of buildings families will be willing to live in, including local vernacular characteristics
- Willingness to invest: keeping in mind temporary housing is only one phase of reconstruction, how much the government, NGOs or families are willing to, or able to invest.
- Politics: interest in supporting certain groups
- Supply of building materials: from where can materials be procured, how long it will take and how much it will cost.

- Length of time temporary housing will be needed: if temporary housing is only foreseen to be needed for six months, it will require a different solution that temporary housing needed for two years, five years, or more.

While each of these factors can play a role in the decision, the weight given to each factor will depend on the given disaster situation.

As is shown in table V, some types of temporary housing require less investment than others. However, the level of investment in temporary housing seems to be only one small part of the decision-making process when it comes to type, with the other above-mentioned factors playing a far greater role.

Table V Different types of temporary housing, the amount of investment required and the tendency for it to be grouped in settlements or dispersed throughout the community

Types of Temporary housing		Dispersed Settlement	Grouped Settlement
	technical solution		
minimum investment	staying with relatives/host family		
	user-built shelters		
	rented apartments		
	public buildings as shelter		
	tents		
	basic house of wood, corrugated sheets*		
	shipping container unit*		
	deluxe prefabricated unit**		
maximum investment	mobile home**		

* may include private kitchen & bathroom

** includes private kitchen and bathroom

Temporary housing can either be placed in grouped settlements or dispersed unit-by-unit throughout the disaster-affected area. 'Grouped' means that

temporary housing units are located in collective centres, communities or camp settlements, where houses are grouped together, sometimes sharing common services. Temporary housing can also be 'dispersed', meaning that the houses are not placed in communities but are distributed or scattered around, usually on separate plots of land. The latter often means that the houses are placed on the land owned by the affected families, next to their damaged houses. As depicted in table 5 by the continuum on the right of the table, different types of temporary housing are *more likely* to be grouped or *more likely* to be dispersed.

6.

The single largest issue in procuring temporary housing is finding suitable, available sites on which to place the units—an aspect which is rarely part of strategic planning.

This research has shown (see discussion in Article II), that procurement of the temporary housing units in a timely fashion is not a major problem in temporary housing. In fact, this aspect has generally been successfully carried out—the units are ordered and can be delivered with a reasonable delay of a few weeks to a few months. In some cases, there has been pre-disaster strategic planning for how to acquire the units, yet even if there was a lack of strategic planning, stopgap tactical planning seems to have been adequate enough.

Establishing possible locations for temporary housing is something that has not been common in disaster preparedness planning. However, interest in this aspect of planning has taken hold during the course of this research and a few recent examples do now exist, see Bologna (2006) for work in Italy and Ozcevik and co-workers (2003) for work in Istanbul, Turkey.

7.

The location of temporary housing in relation to (i) the families' former house, or (ii) established infrastructure and services, can have a huge impact on the success of the project. Trade-offs must be made to have the temporary housing available as soon as possible yet in locations that will be conducive to recovery.

Temporary housing can be placed on different kinds of sites (see table VI), which vary in their proximity to established urban areas and in their ownership.

Table VI Possible kinds of sites for temporary housing, by case study

SITES FOR TEMPORARY HOUSING/IMPLICATIONS	Turkey (1999)	Colombia (1999)	Japan (1995)	Greece (1986)	Mexico (1985)	Italy (1976)	United States (various)
near damaged house on family's own land	■	■					■
parks/squares in urban area		■	■		■		
vacant public land in urban area	■	■	■			■	■
private leased sites in urban area	■	■					■
along roadways				■			
public land, outskirts of city	■		■			■	■
private leased land, outskirts of city	■		■			■	■

Each of these sites has different implications for the temporary housing programme, some are positive and some are negative—as shown in table VII. Constructing houses on several small plots of land within the city, especially if negotiations are required to secure the land, may take more time than building on one large plot of land outside the city. Nevertheless, temporary housing that is placed on the families' own land, or in the city near

their destroyed dwellings will be more convenient for the families, whereas housing far away from their pre-disaster location can be socially devastating and isolating, especially for elderly people.

Table VII Possible sites for temporary housing and their implications

SITES FOR TEMPORARY HOUSING/IMPLICATIONS	convenient for family	use existing infrastructure	use existing services	frees up land for rebuilding	plenty of space	quick to find & build large site	separate plots needed, not apartments	must vacate land with short time	long-term use possible	land can remain polluted	converting farmland	time needed to negotiate land lease	infrastructure and service investments	detached from normal social network
near damaged house on family's own land	■	■	■				■		■					
public parks/squares in urban area	■	■						■						
private leased sites in urban area	■	■											■	
along roadways	■													
public land, outskirts of city						■				■	■	■		
private leased land, outskirts of city						■					■	■	■	■

positive factors (+) ◄─────────────────────────────────► negative factors (-)

8.

Land tenure for temporary housing sites, meaning how long the units can legally stay on the land, will impact the outcome of the project. Houses built on land that is leased, especially from a private owner, will be less likely to become permanent.

Housing that is on private land, or in public areas such as parks, squares and rights-of-way will have very definite end dates when the houses must be removed and the land returned to normal. In the Colombian case, playing fields used for temporary housing were returned to their former use after the

lease expired in three years. In Turkey, as was discussed in Article IV, temporary housing that was built on the private sites had to be removed and the sites had to be cleared and returned to their original state after five years. This was in sharp contrast to temporary housing built on public lands, on which, in some cases, the temporary housing remained almost indefinitely, while in other cases the sites remained polluted, littered with infrastructure and other debris.

Having a definite end date for a project means temporary housing is less likely to become a permanent blight on the environment. However, families who are genuinely in need of housing will lose housing that they most likely desperately need.

9.

On the whole, the affected population is not invited to participate in formal temporary housing projects. This is even more pronounced in government-led projects versus NGO-led projects. Having families as key-decision makers in the process of housing recovery is of great importance. However it seems that the necessity to build temporary housing quickly outweighs this importance in the majority of projects.

Table VIII lists the organisations involved in temporary housing and how they are implicated in the seven stages of the lifecycle, in each of the six case studies.

Table VIII Organisations taking part in temporary housing for each case study, by life cycle stage

ORGANISATIONS TAKING PART IN TEMPORARY HOUSING /LIFE CYCLE STAGE	strategic planning*						programme planning						project planning						design						construction						operation						dismantling					
	Turkey (1999)	Colombia (1999)	Japan (1995)	Greece (1986)	Mexico (1985)	Italy (1976)	Turkey (1999)	Colombia (1999)	Japan (1995)	Greece (1986)	Mexico (1985)	Italy (1976)	Turkey (1999)	Colombia (1999)	Japan (1995)	Greece (1986)	Mexico (1985)	Italy (1976)	Turkey (1999)	Colombia (1999)	Japan (1995)	Greece (1986)	Mexico (1985)	Italy (1976)	Turkey (1999)	Colombia (1999)	Japan (1995)	Greece (1986)	Mexico (1985)	Italy (1976)	Turkey (1999)	Colombia (1999)	Japan (1995)	Greece (1986)	Mexico (1985)	Italy (1976)	Turkey (1999)	Colombia (1999)	Japan (1995)	Greece (1986)	Mexico (1985)	Italy (1976)
Affected Families																		■	■						■																	
NGOs & Aid Agencies							■						■						■												■	■						■				
Municip./Region. Gov.		■					■		■	■	■		■	■		■	■	■			■	■	■		■	■	■	■	■		■	■	■	■	■		■	■	■	■	■	
Central Government	■	■					■		■	■	■		■	■					■																							
Building Industry																		■	■		■		■	■	■	■	■	■	■													
Municipal Services													■	■											■	■	■	■	■		■	■			■		■					
Land Owners																■																										
Lending Institutions							■			■			■																													
General Contractors																		■							■	■	■	■	■								■	■	■	■	■	■
Trades people																									■	■	■	■														
Designers/Planners																		■	■					■																		

This table shows how the municipal and regional government are the most heavily implicated in temporary housing throughout the projects' lifecycles. However, different organisations play a part in different stages; an examination of the lifecycle stage brings out the following points:

- *Strategic planning* is absent in most of the programmes and if it does occur it is either the central or regional governments that are involved.
- *Programme planning:* Government and lending institutions do programme planning, except in Colombia where the responsible NGO handled it. In Italy, the affected population had a small role in the temporary housing at this stage.
- *Project planning:* a wide variety of participants are involved in planning individual temporary housing projects. The cases present no clear pattern of organisations involved except for the municipal/regional governments and the municipal service providers.
- *Design:* Designers, planners as well as governments and the building industry are involved in this stage. While a normal housing project would most likely have affected families implicated now, only in the

Colombian project did affected families participate, and this is only because they were supplying their own self-built shacks.

- *Construction:* This stage brings in a variety of participants that have little involvement in the other stages, such as trades people and general contractors. Also heavily involved in this stage are the building industry and municipal services providers.
- *Operation:* the municipal/regional governments as well as NGOs and affected families are involved. In some cases, people who are living on site are employed to manage the day-to-day operations and services.
- *Dismantling:* Almost solely managed by the local government who hires general contractors to complete the work.

Throughout all of the temporary housing projects there is a serious lack of community participation. Affected families are absent from the decision process, or are in fact only sporadically involved in any of the stages of temporary housing. This can be contrasted with the average low-cost housing project in developing countries, which will typically implicate families in the stages of project planning, design, construction and operation. Their implication may only be at a very cursory level, such as giving their opinion on a number of set alternatives, or they can be implicated in real decision-making roles (see Arnstein, 1969; Choguill 1996; and Davidson et al. 2006 for more about the roles of communities in building housing projects).

A likely reason for this lack of participation is that temporary housing projects must be completed very quickly and participatory methods take more time to implement than top-down non-participatory methods. In order to provide temporary housing as quickly as possible, governments and NGOs take on the decision-making roles as if by necessity.

While there is certainly a lack of user participation in formal temporary housing projects, families are often implicated in building their own temporary

housing - a factor that is not emphasized in the case studies in this research. In any disaster situation, there are many families that supply their own temporary housing; however little data exists about the extent of this because they are not part of any formal project and their houses are dispersed throughout the affected area. For example in Turkey it was observed that many families had built their own temporary housing on their land, or on open land adjacent to their apartment building.

10.

Temporary housing is best integrated with the other stages of housing recovery and other recovery systems, so as to maximise the efficiency of the use of resources and to offer a coherent and transparent recovery strategy for the families. Closely associating the management of these stages and other recovery systems is a key to good projects.

One way to look at the organisational design of temporary housing is to measure the extent to which temporary housing programmes are *integrated* into an overall approach to achieving housing recovery or *separate* from other elements of the disaster recovery and reconstruction planning, decision-making and financing. Bolton (1997) argues that temporary housing programmes that are integrated are less disruptive to families because they have a clearer picture of their stake in long-term housing solutions and also the affected families can take a more active role in planning their temporary and permanent housing. Furthermore, Bolton (1997) points out that an integrated programme minimises the resources spent on temporary housing so that they can be focussed on permanent housing, while still making sure families are adequately housed as quickly as possible.

For example, after the Mexico earthquake, there was a highly integrated programme where one organisation was responsible for temporary and for permanent housing. Temporary housing consisted of very basic shelters erected near the permanent housing sites so families' living patterns were not

disrupted and they could take part in the decision-making process for the permanent housing. This can be contrasted with Japan where large investments were made in the temporary housing, which was located far away from the damaged buildings. Families did not have a clear picture of their future housing opportunities and in the end many did not benefit from receiving permanent housing. In figure 37, each of the case studies is plotted on a continuum showing the extent to which the interim and permanent housing solutions are either more or less separated among different programmes and decision-making entities or more or less integrated in terms of decision-making and of implementation.
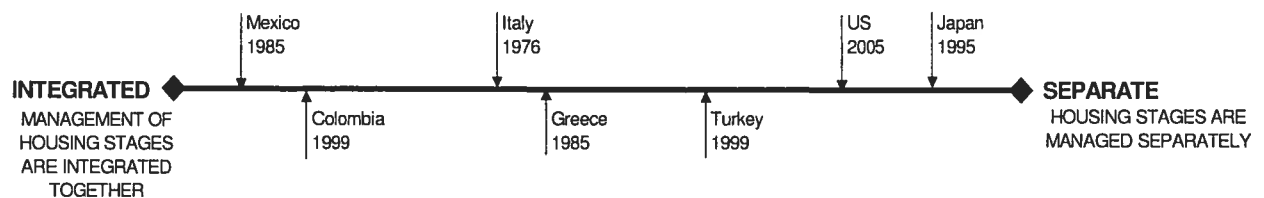

Figure 37 Continuum showing extent to which temporary housing programmes are integrated into or separated from disaster recovery

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11.

One of the major difficulties with temporary housing is perhaps simply its name "temporary" since temporary housing has a tendency to become permanent. Families who were renting prior to the disaster are more likely stay on in temporary housing than families who were homeowners.

In urban areas, where there was a shortage of housing stock before the disaster, exacerbated by the loss of housing and shortage of resources to both replace and increase the housing stock, it is common that the temporary housing could become permanent.

Families who were homeowners before the disaster seem to fare better in replacing their home than do families who were renting before the disaster. Money to replace losses, such as insurance, government grants, or even finished houses are available to homeowners to help them recover. At worst, the family can rebuild with their own resources, on their own land. However, it is renters, typically, that lack permanent housing solutions after a disaster, since less housing is available and rents generally increase, especially at the low end of the scale. For example, in Turkey, the average price for renting an apartment in Izmit more that doubled after the earthquake. It is for this reason that renters tried to remain in temporary housing for as long as possible (note that some NGOs launched permanent housing projects aimed at renters). This is not to say that renters were the only type of people remaining in temporary housing, because, as was established in Article IV, there was a range of different families staying in temporary housing, some of whom were not even impacted by the disaster.

12.

Temporary housing can still be useful as an alternative contribution to the medium-term available housing stock, especially for renters. However, planning for long-term use or other outcomes, such as sale or reuse as another function, needs to be organised and designed for from the outset of the project.

The outcomes of the temporary housing, in each of the four major case studies, are plotted in Table IX. Outcomes labelled with numbers 1 through 4, where the houses continue to be used on site, were not intended at the outset of the programme. Outcomes labelled 5 through 8 show what happened to the temporary units once they were removed from the site; in most cases, these were the intended outcomes for the temporary housing. Outcome 9 did not occur in any of the formal temporary housing case studies, however it

was observed in some housing initiatives by individual owners (see point 13 below).

Table IX Outcomes of the temporary housing units in each of the case studies

OUTCOME OF THE TEMPORARY HOUSING UNITS/CASE STUDY			Turkey (1999)	Colombia (1999)	Greece (1986)	Italy (1976)
houses remain on site	1	rental units for those who do not have permanent housing	X	X		
	2	housing for extended family members	X	X	X	X
	3	squatter housing for those not affected by disaster	X	X	X	X
	4	storage for family's belongings			X	
houses removed from site	5	sale of unit to private owners	X			X
	6	dismantling, (refurbishment), storage of parts or whole building	X	X	X	
	7	export to other disaster areas				X
	8	reuse for public (i.e. sporting club, school)	X			X
	9	integrate parts into permanent housing				

In planning for the management of temporary housing over the long term, the options for are:

- Temporary housing remains on the site and continues to be used as housing. This requires a management that can rent the houses and maintain the site.
- Temporary housing is moved to another site and used as housing or for community use such as a sport centre or school. This requires:
    - Resources to move the units, likely a new owner or local government that can pay to have the units moved and reconstructed on the new site. Some modifications and renovations to the units may also be required.
    - Designs that will facilitate dismantling and reconstructing. This needs to be incorporated into the initial design of the unit.
- Materials or units can be sold or donated to those who can use them. Although this sounds like a basic idea, it requires policies that allow families to access to the materials, which has not always been the

case. It is less costly than storing them and more sustainable than disposing of the materials.

- <u>Integrating the temporary housing into permanent housing through renovation.</u> Little evidence of this exists on a project scale, however it was found that in Turkey individual homeowners do take advantage of this option.

- <u>Dismantle, refurbish and store the units.</u> It was found in the case studies that this option is the most likely to have been planned for, however it is more feasible for sturdy container-style units than for prefabricated buildings. Refurbishing and storing the units can be very expensive unless particular facilities exist for this purpose, particularly if building manufacturers can perform the refurbishment, if the government does not have the facilities.

13.

Individual homeowners were successful in using a temporary house, placed on their own property, as a 'core house' which to build their permanent house around. This could be a sustainable practice to be followed in formal temporary housing projects.

It was observed in Turkey that some affected families used their temporary house as a core house. One example was where a container was the initial temporary house placed on the private land of the affected family. The family, who did not want to move to the permanent housing developments because they feared living in apartment blocks, slowly began to build their new house around the container (figure 38). A second example is a family that had two paper houses side-by-side. Since the paper house settlement was built on their brother's land they were able to remain on the land. They started to consolidate the two houses by building a kitchen in the middle of the space between the two houses and have since added on a bathroom (figure 39).
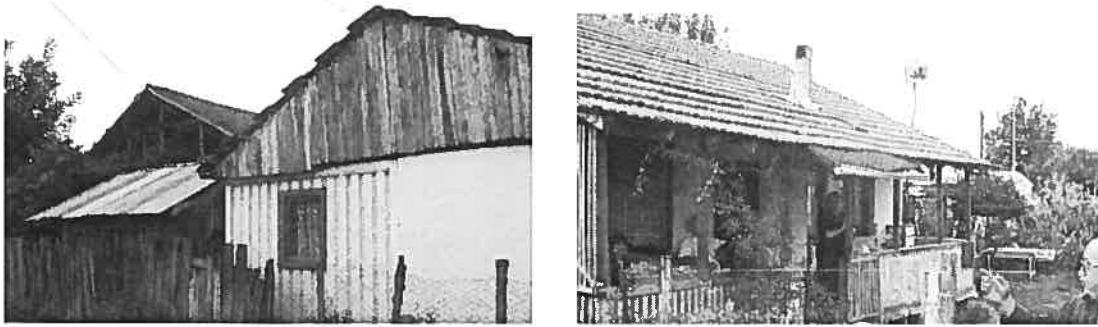
Figure 38 a shipping container modified to be a temporary house becomes a permanent house for a family of four. Side view of the house (left) and front view of the house and the family (right).

Figure 39 Two paper temporary houses are consolidated into one dwelling with the addition of a kitchen and bathroom in the middle. Outside view of the house (left) and inside view of the kitchen built between to the two paper houses (right).

5.2 Recommendations for Project Stages

This research has touched not only on aspects that can be considered to be strategic planning, but aspects to be addressed at each stage of a temporary housing programme. To summarise these findings, the following section offers recommendations stage by stage: pre-disaster strategic planning, programme planning, project planning, design, construction, operation, dismantling. These recommendations (presented in the form of table X) are not meant to be an exhaustive list but focuses on recommendations specific to *planning for temporary housing settlements.*

Table X: Recommendations for planning temporary housing settlements

Strategic planning (pre-disaster)	- Create a 'plan of changes,' a <u>flexible strategic plan for temporary housing that can be adapted to fit the specific disaster situation</u>. This may include several different scenarios for temporary housing programmes that can be drawn on in the event of a disaster, i.e. type of disaster, extent of damage, locus of damage and time of year. - <u>Identify a lead organisation and other organisations that are capable of contributing to a temporary housing programme</u>, including their specific expertise and possible roles. This can include the central government and its ministries, regional government, local government, service and infrastructure providers, building suppliers, consultants, NGOs, community groups and religious groups. Ascertain which people, or which positions, in these organisations that will act as the contact. - Using risk mapping to determine vulnerable areas, define where temporary housing may be needed. Within this region, <u>define sites that would be suitable for temporary housing</u>, keeping in mind proximity to devastated areas and relation to existing infrastructure. Approach landowners, or managers of publicly held land, to make arrangements for possible use of the land. - <u>Develop basic specifications for the design of temporary housing units and layout of sites taking into account local conditions</u> such as: climate and risks, building traditions, family size, way of life and culture. - <u>Identify sources of funding</u> for a temporary housing programme or other relief activities. This must also include funding for operating and dismantling the units.
Programme planning (post-disaster)	- <u>A careful estimation of real numbers and an understanding of what people want or need</u> for temporary housing is of central importance to defining an adequate temporary housing programme. While this may be extremely difficult in the chaotic situation during or right after the disaster, spending resources on this will mean money saved in the long run. - <u>Integration of temporary housing within the overall plan for housing recovery.</u> The plan for temporary housing needs to be made at the same time as, at minimum, a general sketch for permanent reconstruction, or overall housing recovery. The affected population should have a role in planning and decision-making. - Set <u>realistic target dates for the delivery of temporary housing</u> and make sure that everyone, including the beneficiaries, is aware of the calendar.

Project planning	- If possible, <u>decentralise project planning</u> to local communities, municipal governments or locally based NGOs who can adapt the project to meet the specific local needs. - <u>Choose the best possible sites that will satisfy all the constraints of time, investment and convenience.</u> Utilise existing plans for locations of temporary housing and start as early as possible because this process can take time. - <u>Define necessary services and possible providers</u> of those services with a focus on what local communities and residents can offer. - <u>Plan for the outcome of the temporary housing.</u> Decide how long the temporary housing will stay on site (this might need to be somewhat flexible) and decide what will can become of the temporary housing after its initial use, i.e. rental housing, community use, stored for next disaster, sold. Also plan to clean up the temporary housing sites.
Design	- <u>Where possible, work with families to inform design</u> of units and layout of settlements - <u>Design units with their outcome in mind</u>, for example if they are going to be reused it is best if the spaces are flexible in size and it can be dismantled and reassembled again. - <u>Plan for the layout of sites</u>, including groupings, orientation, open space, meeting or community facilities.
Construction	- <u>Draw on existing organisational arrangements</u> for infrastructure construction, if possible - <u>Engage local firms or local communities</u>, where possible, for housing construction
Operation	- Promote <u>operation of settlement by affected population</u>, can be a source of income and a source of pride. - Promote <u>gardens and play areas.</u> - Pay attention to additions and modifications to the houses. It might be necessary to have some <u>policies on which types of additions are allowed</u>. - Use time in temporary housing to have people plan collectively about permanent housing. <u>Communities of temporary housing residents, properly organised, may hold power to influence permanent housing programmes</u>. - <u>Units left empty will soon by occupied by squatters.</u> If

	renting is planned for the units, then it must be managed. If units are to be dismantled, they should be taken down right away.
Dismantling	• <u>Reuse the units</u> if possible as rental housing, community buildings or sell them (or the parts) privately. • It will most likely be necessary to <u>offer other housing options for people who are still occupying the temporary units</u>. • <u>Sites must be cleaned up and left unpolluted</u> once dismantling occurs, because it is unlikely to happen later.

5.3 Conclusions

This research has examined the process of temporary housing, viewing it as an integral yet separate part of the process of post-disaster reconstruction. Applying the systems view toward the problem has revealed the complexity of administering temporary housing projects and has shown the limitations of the ad-hoc tactical planning that prevails in most projects.

What is needed in the chaotic post-disaster situation is a plan that aids in the implementation of conveniently located units that serve the purpose of sheltering disaster-affected families until they have a permanent place to live. This research has shown that if strategic planning for temporary housing projects —up-front before the disaster—is integrated into disaster planning, it can greatly reduce wasted resources and help in offering the best possible solutions for housing recovery. Strategic planning can tackle the full spectrum of the programme before the disaster occurs and can take into account the necessarily related aspects of organisational design, technical design and planning as well as arranging for the most efficient processes to be mobilised—within such a framework—to attain the desired outcomes.

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Yin, R. (2003). *Case study research: Design and methods* (3rd ed.). London: Sage.

APPENDIX A: Temporary housing settlements visited in Turkey

NAME/ DESCRIPTION	TOWN	SIZE*	SUPPLIER	DATE VISITED	PHOTO
ODTU settlement	Izmit	medium	University	Nov 2003	
Korfez settlement	Korfez	large	Government	Jul 2004	
Turk israreli village	Adapazarı	medium	NGO	Jul 2004	
Large village on outskirts	Yalova	large	Government	Jun 2000	
Kiremit Ocağı	Düzce	medium	Government	Jun-Aug 2004	
UMCOR	Düzce	medium	NGO	Nov 2003 & Jun-Aug 2004	
Fidanlık	Düzce	medium	NGO	Jul 2000 & Jun-Aug 2004	

Gümüşpınar	Düzce	large	Government	Jul 2000, Nov 2003 & Jun-Aug 2004	
Wood house settlement	Kayanaşli	small	University	Jul 2000	
Paper house settlement	Kayanaşli	small	NGO	Jul 2000 & Nov 2003	
Green wood house settlement	Kayanaşli	small	NGO	Jul 2000	
Danish village	Kayanaşli	small	NGO	Jul 2000	

*Small=less than 100 units; medium 100-1000 units; large more than 1000 units

APPENDIX B: Photographs of temporary housing

Views of Düzce town centre

Building using traditional seismically safe construction method of wood frame construction (with significant lateral support) and brick infill

Temporary unit used as doctor's office In Düzce (photo taken 4 years after earthquakes)

UMCOR temporary housing units reused as school

Permanent housing developments

Beyciler Evleri housing project

UMCOR project

Government developments

Sites left polluted after temporary housing is dismantled

Temporary housing located on the hill surrounding the city

Some services in temporary housing projects

Paper tube houses viewed after 4 years

Interior views of temporary housing units

Interior of Winterised tent

Views of various temporary housing settlements

Appendix C: Permissions from co-authors and journals

Permissions granted and included in the follow pages:

1) Permission from co-authors of article III

2) Blackwell Publishing for Article II
Johnson, C. (forthcoming). "Strategic planning for post-disaster temporary housing." (Accepted October, 2006 for publication in *Disasters*)

3) Routledge for Article III
Johnson, C., Lizarralde, G., and Davidson, C.H. (2006). "A systems view of temporary housing projects in post-disaster reconstruction." Construction Management and Economics 24(2): 376-378.

4) Elsevier for Article IV
Johnson, C. (2006) "Impacts of temporary prefabricated housing after disasters: 1999 earthquakes in Turkey." *Habitat International* (In press, corrected proof online 05 June 2006 doi:10.1016/j.habitatint.2006.03.002*).*

Déclaration des coauteurs d'un article

1. Identification de l'étudiante

Cassidy Johnson
PhD Aménagement

2. Description de l'article

Johnson, C., Lizarralde, G., and Davidson, C.H. (2006) "A systems view of temporary housing projects in post-disaster reconstruction." *Construction Management and Economics* 24(2): 376-378.

3. Déclaration de tous les coauteurs autres que l'étudiante

À titre de coauteur de l'article identifié ci-dessus, je suis d'accord pour que Cassidy Johnson inclue cet article dans sa thèse de doctorat qui a pour titre « Strategic Planning for Temporary Housing after Disasters ».

Gonzalo Lizarralde		le 8 fév '07
Coauteur	Signature	Date
Colin H. Davidson		080207
Coauteur	Signature	Date

From: Colin Henry DAVIDSON ▮▮▮▮▮▮▮▮▮▮
Sent: 15 October 2006 00:29
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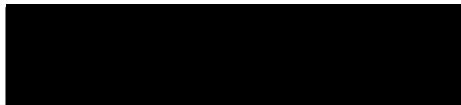1. Identification de l'étudiante

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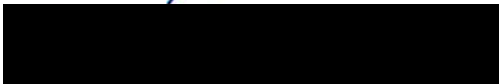Professeur titulaire,
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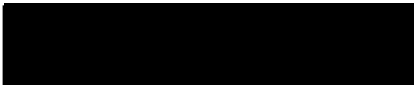
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3. Identification de l'article/ *Name of the article*

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