13 Life on the Edge: Urban Social Vulnerability and Decentralized, Citizen-Based Disaster Risk Reduction in Four Large Cities of the Pacific Rim

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13.1 Background and Objectives

Rapid urbanization and the growth of megacities have for the first time in history resulted in a predominantly urban world. Such an urban explosion, most of which has been in the less developed countries, has increased human exposure to natural and anthropogenic hazards. In particular, the 1990's the world witnessed an exponential growth in disasters. There were 700 large-scale disasters in 1999 alone, which resulted in the death of approximately 100,000 people and caused economic losses in excess of US $ 100 billion. This figure reflects an annual 10 percent increase in losses throughout the decade. In 2003 weather related disasters alone cost insurers $ 60 billion (UNEP 2003).

In 1996 the United Nations University (UNU) launched an international comparative study of the social geography of urban disaster vulnerability. Research on factors contributing to urban social vulnerability was carried out with the aim of incorporating social vulnerability in urban disaster risk management. Collaborative case studies were undertaken in six megacities, four of which are located in the Pacific Basin: Tokyo, Los Angeles, Manila and Mexico City.[2] During the initial phase, citizens' participation and strong links between municipal authorities and non-governmental organizations (NGOs) working with vulnerable groups were identified as critical factors for reducing vulnerability. The extent of these partnerships and whether vulnerability had been included as a planning variable varied considerably amongst the municipalities studied. This chapter attempts to provide an explanation for that variability and also tries to draw out implications for policy and practice.

13.2 Theoretical Grounding

13.2.1 Social Vulnerability

Disasters affecting human beings are the result of complex interactions between human and natural systems. While such an interpretation of disasters is not new (Burton/Kates/White 1978), the depth, diversity, and complexity of the human side of these transactions have only been more fully appreciated in recent work.[3] 'Social vulnerability' to disasters is one of the most important factors at work on the human side of the society – environment relationship.

'Social vulnerability' is defined (after Wisner/Blaikie/Cannon/Davis 2004: 11) as the characteristics of a person or a group that affect their capacity to anticipate, cope with, resist and recover from the impacts of a disaster. Vulnerability is, thus, defined by a number of factors that include social and economic status, as well as the political conditions prevailing that influence a person's or a group's position and

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2 The other two megacities were Mumbai in India and greater Johannesburg (Gauteng Province) in South Africa.

3 See: Maskrey 1989; Blaikie/Cannon/Davis/Wisner 1994; Cutter 1996; Hewitt 1997; Twigg/Bhatt, 1998; Morrow 1999; Alexander 2000; Buckle/Marsh/Smale 2000; Wisner/Blaikie/Cannon/Davis 2004; Pelling 2003a, 2003b; Wisner 2004; Bankoff/Frerks/Hilhorst 2004.

power in a society. There is also a time dimension, as people's degree of vulnerability may vary depending on his or her life situation, age, and also seasonality (Uitto 1998). The spatial dimension of vulnerability is dependent on the fact that people and groups with similar characteristics tend to occupy the same or similar areas. The United Nations Habitat Agenda (see at: <www.unhabitat.org.agenda>) recognized that:

> Vulnerability and disadvantage are often caused by marginalization in and exclusion from the socio-economic mainstream and decision-making processes and the lack of access on an equal basis to resources and opportunity...Vulnerability and disadvantage are mainly caused by circumstances, rather than inherent characteristics.

Alexander (2000: 12–22) distinguishes between several types and levels of vulnerability, especially between 'deprived vulnerability' and 'wilful vulnerability.' In the first case, the knowledge generated concerning hazards and their impacts is not diffused nor utilized for disaster mitigation. In the latter case, this knowledge is deliberately ignored. This implies that the state of wilful vulnerability is maintained because powerful groups in a society have an incentive not to invest in hazard mitigation or to enforce laws and regulations (Wisner 2001; Oezerdem 2003). A typical case might be when there is no incentive to enforce building codes, thus rendering residents vulnerable to hazards, e.g. earthquakes. A further point made by Alexander is that the level of vulnerability is related to the level of economic development in a society. Poorest societies have the least resources to reduce vulnerability. At the stage of rapid development, the assets at risk grow faster than the possibilities of mitigation, thus increasing vulnerability.

Disaster risk is thus a function of the vulnerability of people, including their settlement and livelihood, and the degree to which society has engaged in disaster mitigation activities (Wisner 1999). This can be expressed in a formula, where R = risk; H = hazard (extreme event or process); V = vulnerability; M = mitigation:

$$R = (H \times V) - M.$$

Distinguishing between social protection and self protection (Cannon 2000: 47; Wisner/Blaikie/Cannon/Davis 2004: 88–95), one also recognizes that vulnerability is also to some extent a function of the degree to which people's own capacities for self protection are blocked by social, political, and economic constraints and obstacles. Thus, taking, such local capacity (C) into account, in addition to the social protection afforded by governments (M), the expression for disaster risk becomes:

$$\frac{R = (H \times V) - M}{C}$$

'Capacity' has become a major focus of organizations on the front line of disaster management such as the International Federation of Red Cross and Red Crescent Societies (IFRC), UNDP, and many non-governmental organizations (NGOs). The concepts of capacity and vulnerability are keys to demonstrating that disaster risk development and sustainable human development have a core common agenda (Wisner 2003a; UNDP 2004). Thus vulnerability and capacity in the face of disaster risk should be seen as important components of urban sustainability, and as elements of a sustainable urban livelihood (Sanderson 2000). Capacity as 'self protection', in this context, has many connections with the kinds of citizen-based environmental management activities included under Local Agenda 21 (a major practical follow up to the Earth Summit in 1992). Capacity and vulnerability are largely determined by social factors, such as socio-economic status, age, gender, ethnicity, and health, which have distinct spatial dimensions in an urban setting, and which, in turn, are largely determined by access to resources (Wisner/Blaikie/Cannon/Davis 2004: chap. 3).

13.2.2 Megacities, Globalization, and Vulnerability

The urban regions that have emerged in the latter half of the 20th century are huge, encompassing pre-existing cities, spilling over into watersheds, food and fuel producing areas, and developing satellite or 'edge' cities at a rapid rate (Coy/Kraas 2003; Kraas 2003). These new configurations present challenges of planning and administration as well as difficult logistical situations. The protection of lifeline infrastructure and provision of these cities is often problematic during 'normal' times. Urban metabolism (supply of consumables and disposal of waste) becomes highly questionable in disaster scenarios (Mitchell 1999; Fernandez 1999).

Urban size and fragmentation lead to difficulties in planning and administration. However, beyond this obvious challenge to the megacity, there are complexities in the way that different jurisdictions, agencies and – more generally – stakeholders perceive hazards. This gives rise to significant problems in communication and coordination of effort focused on different

Table 13.1: Population of megacities with 10 million inhabitants (1950-2015). **Source:** UN Populations Division (2006).

1950		1975		2000		2005		2015	
1. New York-Newark	12,3	1. Tokyo	26,6	1, Tokyo	34,4	1, Tokyo	35,2	1, Tokyo	35,5
2. Tokyo	11,3	2 New York-Newark	15, 9	2. Mexico City	18,1	2. Mexico City	19,4	2. Mumbai	21,9
		3. Mexico City	10,7	3. New York-Newark	17,8	3. New York-Newark	18,7	3. Mexico City	21,6
				4. Sâo Paulo	17,1	4. Sâo Paulo	18,3	4. Sâo Paulo	20,5
				5. Mumbai	16,1	5. Mumbai	18,2	5. New York-Newark	18,9
				6. Shanghai	13,2	6. Delhi	15,0	6. Delhi	17,6
				7. Calcutta	13,1	7. Shanghai	14,5	7. Shanghai	17,2
				8. Delhi	12,4	8. Calcutta	14,3	8. Calcutta	17,0
				9. Buenos Aires	11,8	9. Jakarta	13,2	9. Dhaka	16,8
				10. Los Angeles-Long Beach-Santa Ana	11,8	10. Buenos Aires	12,6	10. Jakarta	16,8
				11. Osaka-Kobe	11,2	11. Dhaka	12,4	11. Lagos	16,1
				12. Jakarta	11,1	12. Los Angeles-Long Beach-Santa Ana	12,3	12. Karachi	15,2
				13. Rio de Janeiro	10,8	13. Karachi	11,6	13. Buenos Aires	13,4
				14. Cairo	10,4	14. Rio de Janeiro	11,5	14. Cairo	13,1
				15. Dhaka	10,2	15. Osaka-Kobe	11,3	15. Los Angeles-Long Beach-Santa Ana	13,1
				16. Moscow	10,1	16. Cairo	11,1	16. Manila	12,9
				17. Karachi	10,0	17. Lagos	10,9	17. Beijing	12,9
				18. Manila	10,0	18. Beijing	10,7	18. Rio de Janeiro	12,8
						19. Manila	10,7	19. Osaka-Kobe	11,3
						20. Moscow	10,7	20. Istanbul	11,2
								21. Moscow	11,0
								22. Guangzhou, Guangdong	10,4

stages of disaster management: prevention and mitigation, warning and response, and rehabilitation and recovery (Handmer/Penning-Rowsell 1990; Comfort 1999).

Disaster planners have seldom engaged with the literature concerning 'sustainable cities' (Stren/White/Whitney 1992; Roseland 1997) and 'healthy cities' (Davies/Kelley 1993). Although the IDNDR's intention was to 'mainstream' disaster reduction as part of routine planning, that has still not happened. Disaster management should be indistinguishable from 'normal' urban and regional planning (OAS 1990; IDNDR 1996) but that goal has not yet been attained. Thus in common with much other work in geography, resource management, public health, among other disciplines, the UNU project sought to change 'normal' urban planning practice. In particular, it attempted to identify ways that municipalities and NGOs can cooperate in capacity building for more resilient cities. This requires recognizing the agency and knowledge of a wide variety of citizens and lay people (Enarson/Morrow 1998; Eade 1997; Wisner 1995; 2004) and translating such knowledge into common language that planners and citizens can share.

13.2.3 Focus on Urban Areas in the Pacific Rim

This chapter focuses on four megacities in the Pacific Rim. This geographical focus is natural given that the Pacific Basin has experienced extraordinary urban growth and is now the host of a large number of megacities and extended urban areas. It also has a history of multiculturalism and international migration, a part of which is illegal. Furthermore, the lands surrounding the Pacific Ocean are regularly exposed to a broad range of natural hazards, including earthquakes, volcanic eruptions, tsunami and tropical cyclones (see below).

The rapid population increase and the growth of very large cities in Pacific Asia has long been a cause of concern for urban scholars and planners (Fuchs/Brennan/Chamie/Lo/Uitto 1994). World wide population growth rates are highest in the coastal zone of the tropics, most affected by cyclones (Hanzhou Declaration 1999). It has been projected that urbanization rates in Asia as a whole will reach 54 percent by the year 2020, up from a mere 23 percent in 1970 (Lohani/Whitington 1996). Nine out of the twenty-five largest urban conglomerations in the world are today located in Pacific Asia (Choe 1998). These include the Tokyo/Yokohama extended metropolis as well as Manila. According to the UN's urbanization prospects 2005 of the 22 mega cities of more than 10 million inhabitants 14 were in the wider Asia Pacific region (table 13.1).

All of the cities in the Pacific Rim are exposed to a gamut of natural hazards (Britton 1992; Mitchell 1992). These include earthquakes, tsunamis, flooding, landslides, volcanic eruptions and subsequent lahar flows, forest fires, and tropical cyclones (typhoons or hurricanes) (Orrick/Bemis/Francis/Goss/Howell/Yurkovich 2002: 19–22). An analysis of earthquake hypocenters shows major concentrations along the Pacific, Philippine and South American Plates (Ogawa 1996). Similarly, most tropical cyclones originate near the equator and affect worst Southeast and East Asia, as well as Central America. China, the largest and most populous country on the Pacific Rim experienced during the 40 years 1949–1990 the following on average each year: 5.6 floods, 6 earthquakes greater than R6 magnitude, 6.9 tropical cyclones, and 7.5 droughts (Jingshen/Gangjian/Gang 1992). All of these are capable of affecting China's cities in a variety of ways. Also linking the countries of the Pacific Rim ever more closely through increased trade and migration (legal and illegal) is the diffusion of new and resurgent diseases such as antibiotic resistant tuberculosis, influenza, cholera, and new diseases such as SARS (Wisner/Blaikie/Cannon/Davis 2004: 197, note 5).

13.3 Introducing the Four Megacities

13.3.1 Human and Physical Geography

Table 13.2 summarizes some striking similarities among these four large urban regions besides their location on (or near)[4] the Pacific Rim. First is their size. They all fall squarely into the strict definition of 'megacity' with well over 10 million people living in their metropolitan areas. They are all extensive, but Los Angeles far exceeds the others in sprawl, and has the lowest average density. The other three are densely populated, with both Mexico City and Tokyo, respectively, just below and just above one thousand inhabitants per square kilometre of urban space.

Los Angeles is the youngest city region among them, with even its mere 220 years provides a history rich enough to provide several 'root causes' of social vulnerability to disaster. The others are each twice as old, or nearly so, even dating Mexico City from the Spanish conquest and not from its Aztec origins.

All four urban regions contain considerable flood prone flatlands even though Mexico City is the only one without a coastal location. These latter three have over many years augmented their coasts with considerable land fill which shares with the drained lake bed under the historic centre of Mexico City soil conditions subject to subsidence and liquefaction. In all cases there are hills adjacent to or intermixed with these flatter parts. Therefore, despite their differences in climate, in all cases there are times in the year, or particular climate events, when one can expect landslides.

13.3.2 Economic and Political Geography

Three of these urban regions contain a national capital region and the economically primate city of their country. Tokyo is considered to be a 'world city' in terms of financial networks (Castells 1999). The other

4 Mexico City is 300 km from the Pacific, but it is forcefully influenced by earthquakes that occur at a plate boundary in the Pacific off Mexico's western coast. Also, as the national capital of a country with a long Pacific coast line and major economic linkages with other Pacific Rim countries (the US, Canada, Japan, South Korea, Taiwan); it seems appropriate to include Mexico City despite its landlocked condition.

Table 13.2: Comparison of Four Megacities. **Sources:** *Manila and Tokyo*: Fuchs/Brennan/Chamie/Lo/Uitto (1994); Yeung/Lo (1996); Tayag (1999), Velasquez/Uitto/Wisner/Takahashi (1999); *Tokyo*: Takahashi (1998, 1999); Tokyo Metropolitan Government (1995); *Manila*: Tayag (1999); Asian Development Bank (ADB 2000, 2002); Bankoff (2003b); *Mexico City:* Cruz (1993); Gilbert (1994, 1996); Roland/Gordon (1996); Puente (1999a, 1999b); *Los Angeles*: Wisner (1999a, 1999b, 2003a); Bolin/Stanford (1998); General: U.N. (1999).

Characteristics	Greater Los Angeles	Metropolitan Manila	Greater Mexico City	Metropolitan Tokyo
Population	13	11	18	26
Size (000 Km^2)	87	15	22	14
Density (Pop/ Km^2)	149	733	818	1,857
Age Since Foundation (Years)	220	430	477 (666)	398
Situation	Coastal and inland valleys	Coastal peninsulas between bay and lake	Inland valley on plateau	Coastal, running N and W into hills
Topography	Mix of flood plain, canyon, coastal cliff and estuary	Coastal plain, river flood plain, hilly to East	Centre over ancient lake bed, many ravines to N, W and S, flatter to NE	Flat in much of ward (*Ku*) area, more relief in *Tama* area to West
Climate	Semi-arid	Tropical	Semi-arid	Temperate
Political & Economic Importance	Regional economic role, Pacific Rim and Latin America, regional economic and political role in U.S.	Nationally primate and sub-regional economic role in Asia	Nationally primate in economic and political terms, regional econ. role in the Americas	Nationally primate in economic and political terms, world and regional economic centre
Per cent Poor	25	40	50	10
Per cent in Informal Settlement or Illegal Migrant	5-10	30	40	2-3
Natural Hazards	Earthquake, fire, flood, landslide	Earthquake, flood, landslide, typhoon	Earthquake, flood, landslide	Earthquake, flood, typhoon
Last Major Disasters	Northridge earthquake in 1994; wildfires in 1995	Payatas garbage dump flood, fire, and landslide in 2000	Earthquake in 1985	Earthquake and fire in 1923

Notes: "*Age since Foundation***":** All mega cities were predated by small settlements, some occupied for a long and undetermined period. In the case of Mexico City two ages are given. The first uses the date of the establishment of the Aztec settlement of Tenochtitlan (1325 or 1345). The second uses the date of the defeat of the Aztecs by Cortez (1524). The banks of the Pasig River in present day Manila were inhabited long before the Spanish colonial period, but the age provided uses the date of Spanish control of Manila (1571). **"***Per cent Poor***":** Per cent below locally defined poverty line. Clearly one is dealing with relative and not absolute poverty in these comparisons, however, in all cases among the 'poor' there is little or no surplus for financial investments in self-protection because of the relative expense of food, shelter, utilities, and transport. **"***Percent Informal Settlement or illegal immigrants*": There is little squatter or informal settlement in greater Los Angeles or greater Tokyo except for some semi-permanent encampments of homeless individuals and the illegal use of condemned buildings ('squats'). In area extent and numbers of inhabitants, these are not at all comparable to the large informal settlements in greater Mexico City and greater Manila. However, when one considers the numbers of illegal or undocumented persons in the urban population, a different but related percentage can be estimated for Los Angeles and Tokyo. The commonality between the two measures is 'illegality' and the challenge for risk reduction that that produces. **"***Last Major Disaster***":** The fire bombing of Tokyo during the Second World War is not included, although more recent than the 1923 earthquake and fire, because it was not triggered by an extreme natural event. While the catastrophic mass movement of solid waste, and subsequent fire, that buried homes and people at Payatas, Manila, is partly the failure of a human artefact (a solid waste dump site), the trigger was heavy rainfall.

three have significant regional economic importance: Mexico City and Los Angeles in the Americas, and Manila in Southeast Asia.

It is because of this regional importance that three of the four are the destinations of considerable numbers of illegal immigrants either in the sense of foreign nations in search of livelihoods or political refuge (Los Angeles and, to a lesser extent, Mexico City and Tokyo) or in the sense of nationals who have come from other parts of the country and now live in illegal or informal settlements (large proportions of the population of Manila and Mexico City).

13.3.3 Time Geography of Hazard

Parts of all four urban regions are prone to earthquakes, floods, and landslides. Coastal gales and other storms can affect all but Mexico City. Wildfires are a hazard in parts of Los Angeles, and to a lesser extent, also in Mexico City. These megacities have long chronologies of disaster, although only Tokyo, like San Francisco, London, and Lisbon, has been almost totally destroyed in the past.

Given the social and physical heterogeneity of these great urban regions, and also because of the long journeys to work endured by much of their populations, the time-place geography of hazard is highly contingent and complex at the micro scale.

13.4 Los Angeles and Mexico City: Specific Comparisons

13.4.1 Shared Geographies of Hazard

Los Angeles and Mexico City both encompass large urban regions, with metropolitan populations of 14 and 18 million respectively. They both spread to fill much of the available land in large regions: the coastal plain and internal valleys that run eastward into foothills and mountains in the case of greater Los Angeles; the Valley Mexico and its surrounding mountain slopes and ravines in the case of greater Mexico City. Both urban regions are fragmented administratively. First, in both cases the urban region is divided among multiple administrative jurisdictions: six counties in the state of California and among three Mexican states (but principally one: the *Estado de Mexico*) and the Federal District. Both urban regions are further divided into municipalities: 116 in the case of Los Angeles County, and 65 *Delegaciones* (delegations) in the case of Mexico's Federal District. Finally, in both cases, there is no overarching metropolitan government for the whole urban region as exists for greater Manila or greater Tokyo (Wisner 1999a; Puente 1999a).

Both megacities face a similar array of hazards. Among natural hazards they both face earthquakes, flooding, landslides, and urban-wildland interface fires.

Mexico City is affected most seriously by movements in tectonic plates off the western coast under the Pacific Ocean. This wave energy travels inland, where the local soil factors amplify the shaking, especially in the area of the historic centre of the city, which was built on a lake that was drained in the 16th Century. In 1985 at least 10,000 people died in such an earthquake (Wisner/ Blaikie/Cannon/Davis 2004: 281–292). So far the mortality from earthquakes in greater Los Angeles is lower. Fewer than 100 died in the Northridge temblor in 1994, but the economic loss can run into the billions of dollars (Bolin/Stanford 1998). Also, models based on the 1934 earthquake in Long Beach suggest that thousands could be killed in a future large event (RMS 1995).

Flooding in both urban regions is a hazard because of the intense seasonal rainfall and proximity to mountains that have been largely deforested because of development pressures. In both cases there are extensive and ambitious public works designed to channel and control run off, with varying degrees of success. In the case of Los Angeles the storm drainage canals have produced a secondary hazard of their own. Each year a number of children are swept away by powerful waves of water that course down from the hills with little warning (Rigg 1996; ICBO 2003).

Landslides produce economic loss to homeowners in parts of Los Angeles, but a deadly hazard in some areas of Mexico City. Informal, self-built settlement in some parts of Mexico City is situated over centuries-old, disused mines subject to cave-ins that produce sinkholes. In other areas steep slopes are unstable although inhabited by the poor. In yet others rocks fall from ridges and slopes above settled areas are the principle geomorphologic hazard.

Forest and grass fires affect the outer most zones of Mexico City's extensive area; however the population density is quite low in these areas. By contrast, there are a large number of people living among highly flammable Mediterranean, chaparral vegetation in greater Los Angeles. Limited road access increases the risk. During the great fire in Laguna Beach in 1994 nearly the entire town was threatened, and evacuation

by sea was being considered as the fire was finally controlled (Wisner 1999c; Davis 1998: 95–147).

What sets these urban regions apart is Mexico City's proximity to an active volcano and LA's exposure to coastal storms and coastal erosion. Ash fall from eruptions of Popocatepetl volcano reached the southeast of Mexico City in 1994 and 2001. Persons displaced by the eruption in 2001 were placed in shelters in Mexico City. As the metropolitan area grows in the direction of Puebla, directly on the slopes of the volcano, the hazard from future eruptions will increase (CENEPRED 2004).

Coastal gales are a hazard affecting seaward zones in greater Los Angeles, especially during years affected by El Nino. The pier in Santa Monica was washed away in El Nino storms, and high value real estate routinely falls into the sea from the Palos Verde peninsula northwards through Malibu (Glantz 2001).

These two urban regions also face similar technological hazards. Explosions and fires from the refining industry have occurred in both places. Air pollution is a chronic problem in both Mexico City and Los Angeles (Wisner 1999a: 405–409; Puente 1999a; Ezcurra/Mazari-Hiriart/Pisanty/Aguilar 1999). Sewerage and drainage systems in both urban regions are sometimes overcome. In Los Angeles there were large discharges of raw sewage during storms in the late 1980's and 1990's (Davis 1990: 196–200). In Mexico City the deep sewer system put in at great expense in the 1960's serves only the central part of the city. Given the natural problems of drainage on an ancient lake bed, even this limited system cannot always cope with run off, and the majority of residents live in areas where sewage is discharged into the *aguas negras* (black waters) of narrow ravines and streams (Excurra/Mazari-Hiriart/Pisanty/Aguilar 1999; DuMars 1995: chap. 5)

13.4.2 Shared Sociology of Survival

One tends to think of Los Angeles as rich and Mexico City as poor. However, differences in average per capital income make little difference for the most vulnerable social groups in both places. In both urban regions the working poor spend considerable income on minimally adequate housing and long, expensive journeys to work. Given the neo-liberal trend towards privatization and elimination of social welfare benefits in both the US and Mexico (and especially in California, where the neo-liberal model got its start with a referendum in 1978 that froze public expenditure – the so-called 'tax payer rebellion'), there is limited access to health care, quality education, and social services for the working poor on both sides of the border (Bolin/Stanford 1998; Wisner 1999a). Tension between authorities and illegal immigrants has grown far worse since the attack on New York's World Trade Towers in September 2001 (Wisner 2003b), despite the fact that a Hispanic mayor of Los Angeles has been elected.

Contrary to expectations, there is probably better access to primary health care for the poor in Mexico City through the system of social security hospitals than in Los Angeles, where the emergency room at USC/County Hospital has become the de facto provider of primary care for a large number of people who do not have private health insurance. Throughout the LA metro region smaller community and church-run hospitals are closing or being sold to Health Management Organizations due to the economics of concentration and privatization of healthcare.

The bottom of the socio-economic distribution in Mexico City tends to be immigrants from areas of Mexico inhabited by indigenous groups of people from the south of the country. They are to be found in self-built accommodation in some of the areas of the city with least infrastructure (no drainage, no sanitary system or reticulated water supply) on steep slopes. Their counterparts in greater Los Angeles tend also to be minorities, especially undocumented Hispanic immigrants from Mexico, Guatemala, or El Salvador. They live in areas of the city exposed to highest risk from factory emissions and explosions and floods. They also tend to live in overcrowded tenements that are at risk from fire (often arson) if made of wood, and at risk to earthquakes if they are of the older brick construction. In both Mexico City and Los Angeles there are considerable numbers of homeless youths who are at risk to violence, HIV/AIDS, fires in abandoned buildings, as well as to the other natural and industrial hazards to which all marginalized social groups are vulnerable.

Among these more marginal social groups in both urban regions livelihoods and survival strategies depend on informal networks, casual labour under highly exploitative conditions, many kinds of informal economic activities such as street trading, sale of lottery tickets, etc., and mutual aid. There is mistrust of authorities but a high degree of social solidarity within these social groups. Solidarity is often channelled into the efforts of local NGOs to provide services not provided by official municipal agencies, for example the Pico Union/Westlake Cluster (in LA)

and tenants' association at Tlatelolco or popular education groups, like Los Olvidados.

Given the social and economic heterogeneity within these two huge urban regions, and their long histories, it is not surprising that politics, too, is diverse.

The Hispanics in California account for more than a third of the state's population, and since 1999 the state's 'non-Hispanic whites' have been a minority group (BBC 2000). More and more Hispanics are also registered to vote. Thus, especially in some parts of greater LA, including the City of Los Angeles (the largest single city, with four million people), there is an opening for collaboration between municipal technocrats and the leadership of neighbourhood based NGOs. The voters of the City of Los Angeles also approved a change in the city charter that mandates a more decentralized and participatory process of setting local priorities in social services, public works, etc. The City of Los Angeles' Department of Emergency Preparedness hopes to work with these new neighbourhood councils to spread disaster risk awareness, preparedness, and mitigation of risk.

In Mexico City's Federal District the election of two successive mayors from parties other than the historically dominant PRI has provided support for programmes that reach out to the marginalized population. The Federal District's office of civil protection has not gone as far as its counterpart in LA in the direction of linking its efforts with those of other local government departments or involving local neighbourhoods. However, in Mexico City there is a longer history of rigid hierarchy and paternalism to overcome. It is also only very recently that the Federal District even had an elected mayor. Until 1995 the Federal District was governed directly by the central government (which is to say the historically hegemonic, once-ruling party, the PRI) through an appointed governor. Despite these handicaps, the Federal District is trying some impressive experiments such as the collaboration with the tenants' association at the Tlatelolco high rise apartment complex, and its establishment of a dedicated geological survey team within the office of civil protection. Through its efforts the true magnitude of the landslide, flood, and earthquake hazard in the DF are becoming more widely known.

13.4.3 Contrasting Perceptions of Social Vulnerability

Despite these important similarities in the geography of hazard and the sociology of marginality, the UNU study found quite different definitions or perceptions of who the highly vulnerable social groups were. Table 13.3 summarizes these differences.

Table 13.3: Groups Perceived by Disaster Management Professionals to be Highly Vulnerable to Disasters (per cent of officials). **Source:** Authors' field work.

Mexico City	Los Angeles
Squatters (67%), especially Living in ravines Living over ancient mines Living near hazardous industries	Elderly persons (100%)
Children (23%)	Disabled persons (93%)
Legal immigrants (16%)	Persons with special medical needs (86%)
Disabled persons (14%)	Mentally ill (54%)
Elderly (14%)	Illegal immigrants (29%)
Homeless (11%)	Foreigners/ foreign-born (29%)
Mentally ill (5%)	Homeless (21%)
Persons with special medical needs (5%)	Street children (14%)
Illegal street vendors (5%)	People living near oil refineries (7%)
Artisanal fireworks producers (5%)	People living near water pumping stations (4%)
Street children (2%)	People living in mobile homes (4%)

Notes: "% officials": Percentage of 44 disaster management officials interviewed in greater Mexico City and 28 interviewed in greater Los Angeles. "Legal immigrants": This includes people from the rural areas of the country where indigenous people live. "Foreigners/ foreign-born": This was said to be mostly to do with lack of knowledge of English.

In Mexico City the more detailed breakdown by age, gender, socio-economic status was generally thought by officials in both the Delegations of the DF and the Municipalities of the *Estado de Mexico* to be an academic luxury of a rich country. While a small number of the respondents did acknowledge that some of these groups face additional risks or additional problems in recovery from disasters, the consensus was different. Most believed that illegal or informal squatters, who most commonly live in ravines, over the ancient mines in some of the surrounding slopes,

were generally vulnerable. They thought that everyone in such a living situation was vulnerable without finer distinctions. The exception to this concerned a more common belief that children needed special protection.

In greater Los Angeles there was nearly universal acknowledgement of the special vulnerability faced by the elderly, disabled persons, children, and people with special, chronic medical needs (e.g. those on oxygen or ventilators at home or those in need of frequent dialysis). The mentally ill or retarded were also recognized in more than half of the interviews with disaster management officials in greater Los Angeles. A smaller, but significant group of municipalities took the legality of immigrant status, language ability of foreigners or the foreign born, and homelessness to create situations in which people can suffer increased vulnerability to disaster.

13.4.4 Similar Approaches to Knowledge and Planning

Despite differences in the way that social vulnerability is defined and understood by municipal disaster managers, their approaches to planning and to the acquisition of information is similar. Table 13.4 summarizes these data.

Both Mexico City officials and their counterparts in greater Los Angeles involve neighbourhood groups and NGOs in the planning process, but more do so in the Mexico megacity. This difference is due in large part to the history of social and political organization the two urban regions. In Mexico there is a long history of political party patronage and clientelism that manifests itself in the form of a variety of local associations and groups. There is also a tradition of opposition and protest in Mexico that gives rise to other groups.

It is striking, however, that despite claims of involvement of citizens in the planning process, very few municipalities in greater Mexico City actually obtain information about socially vulnerable groups from neighbourhood groups (where, of course, the fine grained and detailed information exists).

At the level of the municipal jurisdiction both sets of officials claim a high degree of inter-sectoral cooperation. In part this turns out in practice to be a matter of legal formality – attending the same planning meetings, signing off on the same planning documents. However, more than half in both cases claim to obtain information from other departments in the

Table 13.4: Knowledge of Vulnerable Groups and Planning of Programmes to Reduce Vulnerability In Mexico City and Los Angeles (per cent of officials). **Source**: Authors' field work.

Mexico City	Los Angeles
Involve neighbourhood groups in planning (71%)	Involve neighbourhood groups in planning (50%)
Obtain information from neighbourhood groups (9%)	Information from neighbourhood groups (21%)
Involve NGOs in planning (43%)	Involve NGOs in planning (21%)
Inter-sectoral coordination at the municipal level (91%)	Inter-sectoral coordination at the municipal level (100%)
Information from other government department in municipal government (68%)	Information from other government department in municipal government (61%)
Information from national agencies (30%)	Information from national agencies (14%)
Experience problems using social data (66%)	Experience problems using social data (71%)

Notes: *"Involve neighbourhood groups..."*: Many of these take the form of groups formed around someone who has taken the free 18-hour course made available to citizens called *Citizen Emergency Response Training* (CERT). The inspiration for this kind of training came from the experience of spontaneous citizen action after the 1985 earthquake in Mexico City, where LA Fire Department chief Frank Borden had gone as an observer. The course included fire suppression, light search and rescue, first aid, transportation of the injured, communication, and team leadership. *"Involve NGOs in planning"*: One of the six municipalities that involve NGOs is the City of Los Angeles, where there is an active network of 70 NGOs with official status in the planning and emergency response system called the *Emergency Network Los Angeles* (ENLA). There is a great contrast between a city like the City of Los Angeles and its relationship with NGOs through ENLA, and other, much smaller municipalities that have no process for involving NGOs with the exception of the two national, quasi-governmental bodies, the American Red Cross and the Salvation Army. *"Inter-sectoral coordination...":* Universal claims of coordination are explained by the legal requirement in California to follow what is known as the *Standard Emergency Management System* (SEMS), which mandates plans, and exercises that involve multiple sectors and mutual aid contingency arrangement among cities and counties. *"Information from national agencies":* This was most commonly information from the *National Centre for Disaster Prevention* (CENAPRED) or the *National Institute of Statistics, Geography, and Information* (INEGI).

same municipal government. This sharing of information goes beyond mere formalism.

A most striking result is how few municipalities take advantage of the many publications and electronic information sources made available by their respective national government agencies. In part this is a matter of lack of financial resources and labour time by understaffed, small municipal offices. In part this is a reflection of the background and lack of specific training in social science of most of those who work on disaster management at the municipal level. In greater Mexico City they mostly have engineering backgrounds or some from the construction industry. In greater Los Angeles they come either from careers in law enforcement or from fire fighting. In neither case do the managers find it easy to use social data.

Municipalities generally have the technical (and possibly the financial) resources for meeting the needs of socially vulnerable groups, but they lack detailed information about them and lack their trust. NGOs (and some neighbourhood groups) have more detailed information about socially vulnerable groups and, because of more frequent and positive contacts; they tend to have their trust. Therefore, the overall conclusion of the UNU study is that municipalities and NGOs/neighbourhood groups need to cooperate. They need to share their strengths and make up for one another's weaknesses. However, such cooperation is hard to put into practice.

13.5 Manila and Tokyo: Specific Comparisons

13.5.1 Shared Geographies of Hazard

Manila and Tokyo both have coastal locations, where flooding is a hazard and typhoons are capable of damaging exposed areas. Long histories in both cases of the reclamation and extension of coastal land with land fills and dense urban encroachment on, even paving over, rivers flowing into their respective oceans exacerbate these hazards.

Bankoff (2003a: 11; 2003b) notes that flooding in Manila was a frequent occurrence during the 19th Century, and that since records were kept, there have been serious floods in 1942, 1948, 1966, 1967, 1970, 1972, 1977, 1986, 1988, 1995, 1996, and 1997. Tayag identifies three triggers of flooding in Manila (1999). Low-lying areas are flooded when the major river systems (the Pasig-Marikina Rivers and San Juan River) overflow, especially when accompanied by high tide. Such flooding can occur when there is excessive rainfall due to typhoons, to the annual Southwest monsoon, or to showers that cause isolated flash flooding. She notes that flooding in greater Manila is aggravated by poor or non-existent drainage, rapid urbanization, low river capacity due to heavy siltation, dumping of refuse into rivers and the encroachment of settlement into flood plains. Water management in Manila is also complicated by over-pumping of ground water and salt-water intrusion from Manila Bay (Rau 1992: 282).

Located in 'Typhoon Alley', the Philippines suffer most from cyclonic storms. Between 1948–1999 its 780 inhabited islands experienced 200 typhoons (Longshore 2000: 260). Greater Manila has been seriously affected by typhoons in 1937, 1956, 1970, 1972, 1983, and 1995.

Secondary health hazards, especially cholera, dengue, malaria, and measles epidemics have been found to be associated with flood disasters (Relox/Perez/Villareal 1997). Another study found that in the greater Manila region between 1984–1988 "hospital admission of dengue fever cases increased 1-and 2-month after the cyclone passages while gastroenteritis, hepatitis, typhoid fever, bronchopneumonia and tetanus admission decreases after the typhoon" (Relox/Arruejo 2002).

Tokyo also has a long flood chronology. In 1910 nearly the whole of central Tokyo was flooded when heavy rainfall in the Chichibu Mountains caused the Arakawa River to burst its banks. Typhoon Catherine in 1947 again caused the Arakawa to overflow, together with the Tone River, and 300,000 people had to be evacuated (see at: <http://www.ara.or.jp/asc/english/history/history.html>. The Tone River flooded again in 1981, 1982, and 1983 (Kishii/Kuzuha/Hayano 2002). Oya and Haruyama (1987: 2) list 26 floods affecting the lowlands of greater Tokyo between 1963–1984 alone. Kumagai and Nojima (1999: 67) acknowledge the high flood hazard in greater Tokyo, but they stress that since 1966 there has been massive investment in structural mitigation (embankments, pumping stations, water gates) and no significant flooding in the lowlands. In fact, reliance on such physical works began in 1911 with public works designed to control the Arakawa River (finally finished in 1930). The result has been a westward shift of flooding from the lowlands into more hilly regions of greater Tokyo (as population has grown in these former rural areas). One trigger for flooding in greater Tokyo is cyclonic storm, especially the spring and autumn 'rain typhoons' that bring large amounts

of rain. Tokyo is further north than Manila, and so it experiences typhoons less frequently, perhaps one every two or three years, with a particularly severe storm hitting every five or six years (Longshore 2000: 200). Although the shape of the coast near Tokyo and normal storm tracks make it unlikely that it would receive a direct hit by a typhoon, wind, rain, and storm surges associated with storms that pass nearby have caused millions of dollars of damage over the years, for instance in 1934, 1945, 1961, 1965, 1969, and 1991 (RMS 1999). This, however, is a matter of economic loss and not lives, homes, and livelihoods lost, as in Manila. The most deadly recent typhoon to affect Tokyo was in 2002, when four people died in the worst storm to strike in fifty years (BBC 2002).

The hills and low mountains that rise, in both cases, from behind the coastal plain are prone to landslides, flash flooding, and also produce run-off that must find its way through densely populated urban cores before discharging into the Laguna de Bay or Manila Bay in one case, or into Tokyo Bay in the other. As we have seen earlier, this is also the case in greater Los Angeles.

Both Manila and Tokyo have experienced rapid growth of population and also in the numbers of industrial facilities, including refining and storage of petro-chemicals and other potentially hazardous industries capable of causing explosions and chemical spills during floods and earthquakes. In Tokyo, for example, most middle-class and high income residential areas are in higher areas, and the lower zones are devoted to industrial facilities as well as working class housing. This includes a 40 km long corridor along Tokyo Bay and inland along the Tama River where there are steel mills and chemical plants (Kumagai/Nojima 1999: 65). In Manila there is much chemical and other industrial activity mixed with low income housing along the Pasig River. Complex upland topography combines with a complicated pattern of streams in the plains to produce challenges for maintenance of transportation corridors under extreme conditions. There are many bridges and potential choke points in the transportation systems of both megacities. Even under the best of conditions, transportation is congested.

All of these factors become relevant considering the vulnerability of people, livelihoods, and infrastructure to possible earthquake damage. Tokyo's location near the borders of tectonic plates makes it more prone to earthquake than Manila. There is also a greater value of investment in the built environment in Tokyo than in Manila, so the probability of loss – thus vulnerability – must also be considered higher. On the other hand, mitigation measures are more developed in Tokyo, and the consequences for low income city dwellers in Manila in the event of a major quake would be more severe. In particular, it is less likely that they would be able to restore their livelihoods. The poor have less to lose, but that little is vital to their well-being, and its replacement is more difficult.

Tokyo had at least six major earthquakes since 1615 (Kumagai/Nojima 1999: 66, citing Matsuda 1993). Ten thousand people died in one in 1855, and the Great Kanto earthquake that shook the region in 1923 claimed 140,000. Fire was a major factor in this death toll, and season of the year and wind speed and direction are associated with this additional, secondary hazard (Kumagai/Nojima 1999: 66–67). Since the rebuilding that followed the Second World War much older, flammable construction has disappeared, but the use of natural gas, propane, and petrochemical products has increased in a considerably larger metropolitan area, where crowded areas persist. Despite much planning attention to possible recurrence of a 1923-scale event, especially attention paid to provision of evacuation areas safe from fire, Tokyo still runs a very high risk of serious death, injury, and massive economic loss in such an event (Takahashi 1999, citing Tokyo Metropolitan Government 1998; Hadfield 1991).

Volcanoes tower above both Tokyo and Manila – Mts. Fuji and Pinatubo – although far enough away that the impact of eruptions would be more disruptive than catastrophic, much as ash fall from the volcano Popocatepetl affects the outskirts of Mexico City.

There are five earthquake source zones under or near Manila, including the Marikina Valley Fault that bisects the city. A moderate intensity earthquake affects Manila, on average, every 15 years, and although relatively rare, very heavy damage (VIII or IX on the Modified Mercalli damage scale) may occur with an interval of 79–350 years (Punongbayan/Coburn/Tayag 1993). Given what has already been said about topography and encroachment into low lying areas, liquefaction is one of the major hazards facing Manila residents in the event of an earthquake, together with ground rupture and shaking, fire, chemical spills, and landslides in outlying areas.

In the 1950's and 1960's, during a period of rapid and relatively unregulated industrial growth, Tokyo suffered considerable air and water pollution. Manila still suffers this fate, more through non-enforcement of environmental law than through its lack. A body of

law also exists in the Philippines since the early 1990's that nominally protects the urban poor from arbitrary or forced displacement without due process and sometimes compensation. However, despite the existence of such law, and legal aid NGOs to help the poor take advantage of it, the power of the state to move people out of their established locations is one of the social hazards affecting low income people (Santiago 1998: 117–120).

13.5.2 Contrasting Sociologies of Survival

If patterns of hazard in Tokyo and Manila are similar, coping with and adaptation to hazard could not be more contrasting. First there is the question of poverty. The contrast is greater than between Mexico City and Los Angeles. In Tokyo, there are, of course, perhaps 5,000 homeless people, mostly men. There are low income people, in relative terms, and some groups of illegal immigrants. However, these amount to a very small proportion of Tokyo's population, unlike the underclass and working poor in Los Angeles. In addition, unemployment in Tokyo is lower than the average for Japan, something that cannot be said for Manila in relation to the rest of Philippines.

The Philippine Commission for the Urban Poor estimated that the number of squatters in Manila grew from 1.65 million in 1982 to 3.5 million in 1993 (Tayag 1999: 5). The Asian financial and economic crisis in the years 1997–2000 saw 3.5 million additional people in the Philippines fall below the poverty line, and trends toward poverty reduction were reversed, leaving a national poverty rate near 40 per cent (Racelis 2003). In Manila livelihoods for people living at or below the poverty line depend on casual labour, petty trading, and many dangerous, informal sector activities such as recycling materials from the huge solid waste dump in Quezon City called Payatas (Gonzales 2003; Vanzi 2003; Asian Development Bank 2000; 2002). On 10 July 2000, after torrential typhoon rains, a mountain of garbage collapsed on the self-built homes of recyclers living nearby and more than 200 people died (Mydans 2000), although estimates of the dead and missing go as high as 700–1,000 (Westfall 2001; Luna 2001). Spontaneous, informal, or 'squatter' settlement is the spatial access and shelter strategy essential to the ability of Manila's poor to secure a niche in the urban fabric, even though this means that many people are forced to choose dangerous (contaminated, flood-prone) locations. Low income people in Manila have limited access to some government and NGO social and health services, and poor access to sanitary infrastructure. Even for those people connected to Manila's distribution system, some 58 per cent of the water is lost (O'Meara 2001: 341).

Neighbourhood networks and mutual aid based on kinship remain – as in rural areas – the main safety net for the poor. By contrast, in Japan, officially provided municipal and other government services are the main welfare umbrella. Although many elderly people still live with their children in Tokyo, even this vestige of familial bonds and filial piety is disappearing as the population lives longer and longer and as the cost of urban accommodation continues to rise. Social service and advocacy NGOs are less common in Tokyo than they are in Manila, where widespread income poverty is, to some extent, balanced by rich social capital. Volunteerism is on the rise in Japan following the spontaneous outpouring of youthful solidarity with the victims of the Kobe earthquake in 1995. There are groups advocating the rights of people living with disability and other special groups, yet the militancy and impact of such groups are less in Tokyo than in Manila (Heijmans/Victoria 2001; Tayag 1999).

Age structure also affects the sociology of survival in these two cities, and again a large contrast is apparent. The population of Japan is old by comparison to that of Manila, and many of these elderly live with disability and ill health and are highly dependent on social services and, to some degree, their families. Dependency is also an issue in Manila, where economic pressure at home is cited as one of the main reasons why some children live on the street (Bacos/Ramirez/Dorado/Velasco/Barba, nd). Approximately one-third of Manila's population is aged 1–14 years (see at: <http://www.cityofmanila.com.ph/demography.htm>.

13.5.3 Contrasting Perceptions of Social Vulnerability

The contrast between Manila and Tokyo is similar to that between Mexico City and Los Angeles, only more extreme. Residents of urban informal settlements in Manila were regarded by the majority of the officials interviewed (87 per cent) to be the social group at highest risk (67 per cent shared this view in Mexico City). The elderly and disabled were universally seen as the groups in Tokyo who are most vulnerable. Indeed, a highly nuanced typology of the vulnerable elderly emerged from interviews there in the 23 central wards.

These differences may well mirror the macroeconomic conditions prevailing in the two cities. As in Mexico City, national patterns of poverty give rise to migration to informal settlements in the countries' major economic centres. Urban marginality results, as well, in many homeless children and youth. These were the second most commonly mentioned in Manila.

Reflecting its role as a destination for many legal foreigners with little knowledge of Japanese, such people were considered potentially at risk by 70 per cent of disaster planners in Tokyo. This has more to do with Tokyo's role as a global business and financial centre and less to do with illegal working class immigration, although there are some of the latter who arrive from mainland China, the Philippines, Bangladesh, Iran and North Korea (table 13.5).

13.5.4 Similar Approaches to Knowledge and Planning

Despite considerable economic and political differences between Manila and Tokyo, there is a similar approach to knowledge of disaster vulnerability and planning. Indeed, all four megacities show the same pattern. They all attempt to involve neighbourhood groups in planning. All four also claim high degrees of inter-sectoral coordination and connections with other jurisdictions within the megacities. None of the four cities are particularly good at involving non-governmental organizations in planning. Finally, disaster planners in all had difficulties using social data.

However, there are important differences within these generally similar patterns. Manila and Tokyo were better at the municipal level in acquiring information about vulnerable groups of people from neighbourhood groups (65 per cent and 57 per cent of municipal level respondents saying they did). In Los Angeles only one in five planners could count on this source of information, and a mere 9 per cent in Mexico City.

Another thing in common in Manila and Tokyo was the existence of legally established, strong, and well-financed metropolitan government structures. Their existence explain the high degree of inter-sectoral and inter-city coordination claimed. This was only diminished with Tokyo's wards by the strict interpretation of privacy laws that prevent one department's sharing of social data with another. Neither greater Mexico City nor metro Los Angeles have metropolitan governments, or even informal consortia, that embrace their entire, and very extensive, urban regions.

Table 13.5: Groups Perceived by Disaster Management Professionals to be Highly Vulnerable to Disasters (per cent of officials). **Source:** Authors' field work.

Metro Manila	Central Tokyo
Squatters (87%)	Elderly persons (100%) Bed-ridden elderly (61%) Elderly living alone (48%) Elderly in general (26%) Dementing elderly (13%)
Street children (71%)	Disabled persons (100%)
Elderly (13%)	Legal foreigners (70%)
Disabled persons (7%)	Infants (39%)
Young children (7%)	Persons with special medical needs (35%)
Others (3%)	

Notes: *"% officials"*: Percentage of 31 disaster management officials interviewed in Metro Manila action officers responsible for disaster planning in the 16 administrative subunits of Metro Manila plus 5 at primary district (*barangay*) level, and 10 in a variety of government commissions; and 23 disaster management officials in the 23 central wards in the case of Tokyo. *"Street children"*: However, these respondents believed that they were not responsible for dealing with the vulnerability of street children as their welfare falls under the Department of Social Welfare and Development. Five officials believed that street children are too mobile and transient to be the responsibility of any municipal jurisdiction. *"Disabled persons"*: In the case of Tokyo this included both physical and mental disability. *"Legal foreigners"*: Officials mentioned only legal non-Japanese residents who may have difficulty understanding Japanese language warnings and instructions. While the growing presence of illegal immigrants, especially among those doing casual labour, was recognized, no official believed that they were a group of vulnerable people for whom special disaster planning should be done. Likewise, the homeless in Tokyo subway stations, in parks, and along the Sumida River were acknowledged to exist, but they "did not count" for planning purposes (Wisner 1998). *"Others"*: There were single mentions among the 31 officials (3 per cent) of orphans, students living in boarding houses, women (battered, pregnant, or lactating), mentally retarded (due to drug use), persons in flood prone areas.

Finally, Manila and Tokyo municipalities both used information made available by national level institutions such as Philippine's Presidential Commission on Urban Poverty or Japan's National Land Agency. Nothing like such an uptake of nationally-generated infor-

Table 13.6: Knowledge of Vulnerable Groups and Planning of Programmes to Reduce Vulnerability (per cent of officials). **Source:** Authors' field work.

Metro Manila	Central Tokyo
Involve neighbourhood groups in planning (73%)	Involve neighbourhood groups in planning (100%)
Obtain info. from neighbourhood groups (65%)	Obtain info. from neighbourhood groups (57%)
Involve NGOs in planning (18%)	Involve NGOs in planning (22%)
Inter-sectoral coordination at the municipal level (100%)	Inter-sectoral coordination at the municipal level (100%)
Obtain information from other department in municipal government (100%)	Obtain information from other department in municipal government (13%)
Obtain information from national agencies (100%)	Obtain information from national agencies (100%)
Experience problems using social data (71%)	Experience problems using social data (100%)

Notes: "*Involve neighbourhood groups in planning*" (Manila): The 1992 Local Government Code specifies that local citizen groups must be represented in special bodies such as health boards, but not all municipalities have managed to involve neighbourhoods in disaster planning. "*Involve neighbourhood groups in planning*" (Tokyo): There is a centuries' long tradition of urban neighbourhood groups based on ceremonial functions and other more practical activities such as fire fighting. Tokyo's neighbourhood fire brigades date back to the 18th Century. However, many groups are merely formal and not active. Fifty-seven per cent of officials expressed concern about the level of participation of citizens at neighbourhood level, and 83 per cent characterized their ward's neighbourhood groups as "formal." Only four wards (17 per cent) said they had very active neighbourhood groups. "*Involve NGOs in planning*" (Manila): Excluding the Philippine National Red Cross, which is present and active in all municipalities and treated as part of government for planning purposes. "*Involve NGOs in planning*" (Tokyo): The Japanese Red Cross was referred to in eight wards (35 per cent), and *Shakai Fukushi Kyougikai*, an umbrella organization to coordinate social welfare organizations dealing with visual impairment, physical disabilities, and mental retardation in seven wards. However, only five wards claimed to have active involvement of NGOs in their plans. *"Inter-sectoral coordination...*" (Manila): Via the Metropolitan Manila Development Authority and its Metro Manila Disaster Coordinating Council. "*Inter-sectoral coordination...*" (Tokyo): Via the Tokyo Metropolitan Council. "*Obtain information from other departments...*" (Tokyo): Strict interpretation of privacy laws in all but three wards meant that there was very little sharing of information about vulnerable groups of people from one department (e.g. that dealing with the elderly, for example, or the disabled) and the department of disaster planning. "*Obtain information from national agencies*" (Manila): Particularly the Presidential Commission on Urban Poverty and the Department of Social Welfare and Development. "*Obtain information from national agencies*" (Tokyo): The Tokyo Metropolitan Council provides many maps and planning materials, as does the National Land Agency.

mation takes place in Mexico City (ironically, since the national premier National Centre for Disaster Preparedness – CENAPRED – is located in Mexico City). Table 13.6 presents the data on sources of knowledge and planning in Manila and Tokyo.

13.6 Common Problems and Obstacles

13.6.1 Difficulties Facing Municipality/ NGO Cooperation

The starting point of this research project was the hypothesis that non-governmental and community-based organizations (NGOs and CBOs) can provide a vital link between highly vulnerable populations and municipal governments. In the ideal world, such groups would have information about and trust relationships with marginalized groups of people that the city finds it difficult to understand or to approach. Our research partially supports the hypothesis. However the situation appears more complex than we originally believed. There are at least three complicating issues.

First, most NGOs have their own fairly narrow and well-defined agendas and areas of expertise and concern. In part this is a natural result of how NGOs are formed and remain funded. They carve out niches in the urban ecology. Focused concerns might be housing, legal empowerment, women's rights, sanitation, etc. The problem observed is that such groups see disaster management and the process of vulnerability reduction through the prism of their established agenda. In a more general way, Foreman (1998) has noted the narrowness and inflexibility of NGO agendas as both a weakness and a strength (Benson/ Twigg/Myers 2001).

There were a few, predictable NGOs whose mandate specifically concerns aspects of risk communication or more general disaster management, such as the Red Cross in all four cities, or *Emergency Network Los Angeles* (ENLA) and the Salvation Army. Ironically, however, these NGOs have been so fully 'officialized' and incorporated into the municipal system of disaster management that they do not function as conduits to and from the poorest of the poor and other special needs groups.

In a similar way, we encountered some specialized disaster-oriented CBOs, such as Tokyo's neighbourhood fire fighting teams, the neighbourhoods in central Mexico City trained by the Association of Retired Fire Fighters,[5] and the CERTs in Los Angeles mentioned earlier. These suffer, however, from narrowness of mission and, in the case of Los Angeles, a definite class bias. Most of the roughly 20,000 CERT-trained individuals in the City of Los Angeles are white and middle class.

The second complication concerns politics. In a number of interviews the municipal officials believed that NGOs involved themselves in relief and post-disaster recovery work to further their own political ends. They were not trusted and collaboration suffered. From the NGO side, there was as often a history of antagonism with the government. Mistrust from the NGO side could have deep roots and centre around larger societal issues such as human rights and corruption – giving rise to such epochal changes as the electoral loss of Mexico City by the PRI political party or the use of massive 'people's power' non-violent demonstrations to cause Philippine president Estrada to resign. Mistrust could also be focused on feelings of neglect and social exclusion by the communities served by the NGO, as was the case of the Pico Union Cluster near Downtown in Los Angeles. This is a low income residential district populated by Hispanic immigrants, especially from El Salvador and Guatemala, many of them undocumented. The housing stock comprises five and six storey brick tenements and poorly maintained, subdivided wood-frame Victorians that date from an earlier, more affluent period in this districts' settlement history.

The third complication concerns continuity and capacity building. In numerous cases, NGOs that had formed spontaneously in response to disasters such as the 1985 earthquake in Mexico City or the Northridge earthquake in greater Los Angeles did not persist beyond the early stages of recovery. If the whole point of developing a 'culture of prevention' is to build networks at neighbourhood level capable of ongoing hazard assessment and mitigation at the micro level, preparedness training, and the identification of vulnerable individuals, then the organizational base is weakened or even lost each time 'emergent' NGOs rise and fall in response to specific events.

13.6.2 Problems with Municipal Decentralization

Since the hazardscape of megacities is so diverse, planning and implementation needs to take local variations in hazard, vulnerability, capacity (and thus, risk) into account. Efforts are therefore common to build professional planning expertise at various scales – the megacity's constituent municipalities, and then, moving as close to the neighbourhood as possible. Sometimes this works well, as in some of Manila's *barangays*, within the Tlatelolco public housing complex in Mexico City, and in West Hollywood, where there is a vigorous, neighbourhood based Disaster Volunteer Corps. In such circumstances local people assess their own vulnerabilities and their own capacities. They know, house by house, who lives there who may have special health or disability related needs, and who has special knowledge (nursing, construction, etc.) and skill. However, this kind of neighbourhood based comprehensive planning is still too rare. There are a number of problems that block effective decentralization.

Lack of formal coordination is a problem. Only Manila and Tokyo have metropolitan authorities mandated to coordinate and to support "city" level planning. In Mexico, there is such an authority at the level of the 18 cities (*Delegaciones*) that constitute the Federal District, but Mexico City spills out into neighbouring Mexican states. Nothing but the federal government is formally mandated to coordinate efforts at mitigation, preparedness, response, and recovery across the whole of the megacity area. The State of California's SEMS system legally requires mutual aid arrangements among counties and cities, and being so very large, the City of Los Angeles and LA county do often take a leading role in the urban region, but informally.

Even where coordination and support for decentralization does exist, there is often a failure to take

5 This *Associacion de Bomberos en Retiro* was unknown to municipal authorities, and was unregistered as an NGO, prima facie evidence that it was not the product to client-patron politics so often encountered among nominally independent NGOs in Mexico City.

Table 13.7: Social Capital and Trust Matrix. **Source:** The authors.

Social Capital(SC)	Trust (T)				
	Interpersonal (T1)	HH vs. CBO (T2)	HH vs. Government (T3)	CBO vs. Government (T4)	Government vs. Government (T5)
Knowledge (SC1)	Expertise, memory and mobility	Culture and idiom (class and ethnic differences)	Cynicism and mass media, literacy and criticality	Bottom up vs. top down	Centralism, regionalism and distribution of knowledge resources
Solidarity (SC2)	Duration, contingency and strength	Inclusiveness or exclusiveness (divisiveness?)	Delivery and training	Accountability, delivery, mediation and control	Electoral manipulation, Ethnic politics
Access (SC3)	Intra-household (e.g. gender) distribution and access	Capture and co-optation; Delivery and transparency	Personal experience, oral History and myths	Credibility and legitimation, organizational culture; Brokers and champions	Mediation and bureaucracy vs. direct networking

full advantage of opportunities. There is great variation among Tokyo's 23 central wards (cities) and among Metro Manila's cities in their ability to plan and to conduct outreach to vulnerable groups. The same is true of Mexico City and Los Angeles. In Los Angeles, small, municipalities with little tax base and a poor, often illegal immigrant population are hardly able to maintain essential services let alone conduct sophisticated vulnerability and capacity assessment. Examples are the city of Vernon (Davis 2000a: 191-204) and the city of Compton (Davis 2000a: 137-142).

The most commonly cited constraints cited in the UNU study interviews with municipal level officers were lack of training and lack of resources. Across the four megacities, most of the officers interviewed come from either an engineering background (or the construction industry) or police (or fire fighting). It is rare to find someone with a background in social science, thus the integration of social and physical data in risk analysis does not come naturally to these personnel. They need more training and support. This, however, costs money, and the resource constraint was often mentioned, even in the two more affluent megacities, Los Angeles and Tokyo.

13.6.3 Overview of Issues: On Trust and the Notion of Social Capital

In table 13.7 above we have summarized the key issues that emerge from the cases we have investigated. These are the factors that come into play as five sorts of trust (or its absence) affect the ability to mobilize and utilize the three kinds of social capital – knowledge, solidarity, and access.

From left to right one finds interpersonal trust, trust between households (HH) and community based organizations (HH vs. CBO), trust between households and government at various levels (HH vs. Government), trust between CBOs and government, and, finally, trust among various branches and levels of government. All these manifestations of trust and distrust influence whether social capital remains hidden or latent or is mobilized and becomes active (Barnes 2002; Beck 1992; Beck/Giddens/Lash 1994; Bujra 2000).

History and memory are playing a major role in determining these trust relations. For example, a long history of racism and police brutality in Los Angeles provides the historical background to suspicion between minority households, especially those with members who are illegal immigrants, and government, and it is a major factor that CBOs need to take into consideration (Davis 1990; 2000b). In turn, such CBOs walk a tightrope in order to maintain their credibility with local government and such household constituents.

13.7 Conclusions

If the municipalities in our study of four megacities are at all typical for the Pacific Rim (we think they are[6]), then urban social vulnerability remains a serious problem as yet insufficiently faced by municipal, metropolitan, or other higher levels of government. Among the problems documented are:

- Fragmented and uncoordinated responsibility for different at risk groups;
- Legal barriers to access to social data;
- Staffing shortage and lack of training in use of available social data resulting in little use of existing sources;
- Limited or ritualistic use of community or neighbourhood groups;
- Limited or sometimes no planning at municipal level for longer term recovery issues;
- Political hostility toward NGOs;
- Funding shortages and high turnover in NGO staff.

The last three of these problems are very common and block the effective use of social capital to reduce risk. Socially vulnerable and marginal groups of people in cities have needs but also capacities. Their local knowledge and coping as well as their needs can be communicated to government agencies through NGOs and CBOs. City agencies have systems of risk reduction that may be of benefit to socially vulnerable groups of people. Here again, it is the bridge, mediation, or interface provided by organs of civil society that can provide access to official risk reduction.

On the positive side, however, we have observed the following:

- Innovative use of existing neighbourhood groups for preparedness or even for hazard and vulnerability mapping; in other words, it *can* be done!;
- Cases of excellent coordination between municipality and NGOs;
- Improvements in risk communication and increased sensitivity on the part of some municipalities to the needs of foreigners, both legal and illegal;
- The exponential growth of CBOs and NGOs during the decades of the 1980's and 1990's, therefore producing a basis – with all the pros, cons and difficulties mentioned earlier – for much deeper and systematic relations between cities and civil society.

Our main conclusion, therefore, is that the social basis for disaster-resilient cities is continued generalized capacity building across the whole of these heterogeneous populations (Eade 1998). Revitalized democratic participation in the governance of cities, better education systems, employment generation, broader inclusion of women, minorities, and youth all contribute. This may sound like too sweeping a generalization. However, it is no more general than the oft quoted saying that 'earthquakes don't kill people, buildings do' (Bendimerad/Wenzel/Green/Wisner 1999). On the social side, one could say, "governments can't ensure safety unless the people demand it" (Wisner 1995, 2004).

6 For comparative purposes see: Mitchell 1999; IFRC 1998; IDNDR 1996: U.N. Centre for Human Settlement 1996; Parker/Mitchell 1995; Fuchs/Brennan/Chamie/Lo/Uitto 1994; Stren/White/Whitney 1992.