

Reducing Disaster Risks by Addressing Social Vulnerability through Land Use Planning in Metro Manila

by Tara Ledesma





- Land Area: 636 km²
- Rapid population growth:
 - 1970's: 4 million
 - 1980's: 6 million
 - 1990's: 8 million
 - 2000: 9.9 million
- Population (2005)
 - 11,289,368 (night time)
 - 16 million (day time)
- 1997 share of GDP (1997) 34.5%
- 1997 per capita GDP US\$2,811

Metro Manila Urban Expansion

Table 8.1.4 Land Use Classification in Metropolitan Manila

| Land use | 1972 | | 1980 | | 1991 | |
|---------------------------|---------------|--------------|---------------|--------------|---------------|------------|
| | Ha | % | Ha | % | Ha | % |
| Residential | 13,570 | 28.4 | 18,948 | 29.4 | 41,405 | 65.0 |
| Commercial | 530 | 1.1 | 2,573 | 4.0 | 1,911 | 3.0 |
| Industrial | 1,365 | 2.8 | 3,037 | 4.7 | 2,548 | 4.0 |
| Institutional | 1,800 | 3.7 | 2,892 | 4.5 | 3,185 | 5.0 |
| Utilities | | | 890 | 1.4 | 637 | 1.0 |
| Open Space | 30,980 | 64.0 | 14,380 | 22.3 | 5,096 | 8.0 |
| Agricultural | | | 7,806 | 12.1 | 5,733 | 9.0 |
| Cemetery/ Memorial Parks | | | | | 637 | 1.0 |
| Recreation/ Parks/ Sports | | | 13,012 | 20.2 | 637 | 1.0 |
| Recreation/ Waterways | | | | | 1,911 | 3.0 |
| Reclamation | | | 671 | 1.0 | | |
| Agro-Industrial | | | 236 | 0.4 | | |
| Total | 48,425 | 100.0 | 64,445 | 100.0 | 63,700 | 100 |

Note: 1972 figures from Manosa (1974) Neda Journal of Development, vol 1/2
 1981 figures from Metropolitan Manila Commission (1983)
 1991 figures from NCR Regional Development Plan (1993-1998)

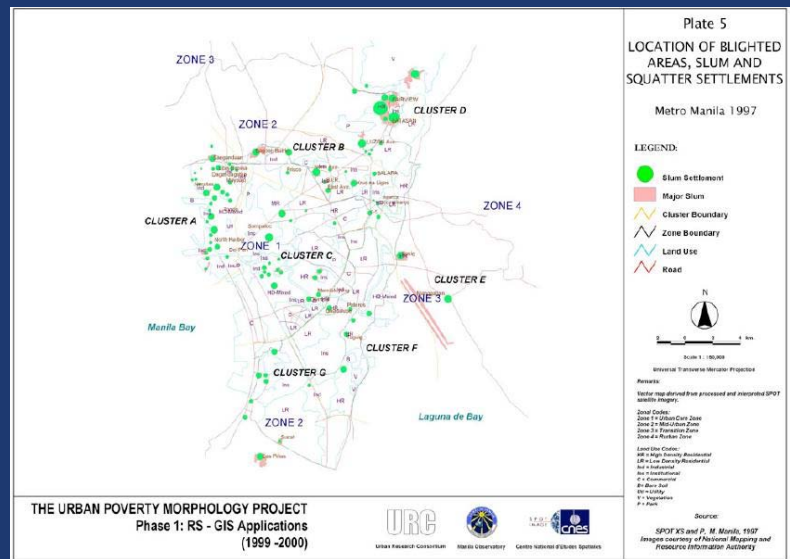
Source: Philippine Institute for Development Studies



Expansion of Urban Land

Challenges as a Megacity:

- garbage collection and disposal
- air and water pollution
- traffic/transportation
- inappropriate land uses
- squatter settlements
- poor housing conditions
- lack of open spaces
- non-conformance from constituent LGUs

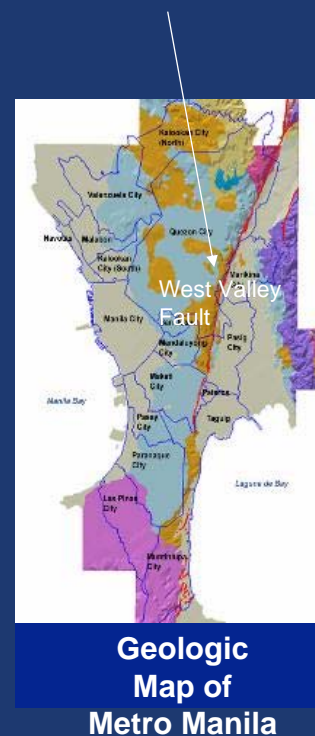


Disaster Threat

Table 2.2.1 Summary of Earthquake Damage

| Scenario Earthquake | Modal | | Modal 08 | Modal 13 | Modal 18 | |
|--|----------------------------------|----------------------|------------------------------|--------------|---------------|------------|
| | Magnitude | Fault Mechanism | Inland Fault | Subduction | Unknown | |
| Residential Building 1,325,896 | Damage | Heavily | 168,300 (12.7%) | 1,800 (0.1%) | 14,200 (1.1%) | |
| | | Partly | 339,800 (25.6%) | 6,600 (0.5%) | 32,700 (4.0%) | |
| | | Population 9,921,560 | Casualty | Dead | 33,500 (0.3%) | 100 (0.0%) |
| Injured | 113,600 (1.1%) | 300 (0.0%) | | 9,700 (0.1%) | | |
| Fire | Outbreak | 300 | | - | - | |
| | Burnt area and building | Wind Speed 3m/s | 794 ha 42,100 buildings | - | - | |
| | | Wind Speed 5m/s | 1,710 ha 97,800 buildings | - | - | |
| | Casualty | Wind Speed 3m/s | 7,900 (0.1%) | - | - | |
| Wind Speed 5m/s | | 18,300 (0.2%) | - | - | | |
| Bridges 213 (with detail inventory and stability analysis 189) Flyover 80 (with detail inventory and stability analysis 38) | Large possibility of falling-off | Bridge | 7 | 0 | 0 | |
| | | Flyover | 0 | 0 | 0 | |
| Water Supply Distribution Pipes Total 4,611km | Break of pipes or joints | Bridge | 2 | 0 | 2 | |
| | | Flyover | 0 | 0 | 0 | |
| Electric Power Transmission and Distribution Line Total 4,862km | Cut of cables | Bridge | 4000 points | 0 points | 200 points | |
| | | Flyover | 30 km | 0 km | 4 km | |
| PLDT Telephone Aerial Cable 9,445 km Underground Cable 3,906 km | Cut of cables | Bridge | 95 km | 0 km | 11 km | |
| | | Flyover | 95 km | 0 km | 11 km | |
| Public Purpose Buildings (Hospital 177, School 1412, Fire Fighting 124, Police 43, MMDCC Organizations and 17 LGU City and Municipal Halls 53) | Heavily Damaged | Bridge | 8 - 10 % | 0 - 0.2 % | 0 - 1 % | |
| | | Flyover | 20 - 25 % | 0 - 0.3 % | 2 - 3 % | |
| Mid-rise and High-rise Buildings | 10-30 building stories | 981 | Heavily Damaged | 11 % | 0.3 % | 2.3 % |
| | | | Partly Damaged | 27 % | 2.8 % | 9.2 % |
| | 30-60 building stories | 119 | Heavily Damaged | 2 % | 0 % | 0 % |
| | | | Partly Damaged | 12 % | 0.1 % | 0.5 % |

Source: Study Team



Projected Earthquake Damages

Table 2.2.1 Summary of Earthquake Damage

| Scenario Earthquake | Model | Model 08 | Model 13 | Model 18 |
|--|-------------------------------------|-----------------|------------------------------|--------------|
| | Magnitude | 7.2 | 7.9 | 6.5 |
| | Fault Mechanism | Inland Fault | Subduction | Unknown |
| Residential Building 1,325,896 | Damage | Heavily | 168,300 (12.7%) | 1,900 (0.1%) |
| | | Partly | 339,800 (25.6%) | 6,600 (0.5%) |
| Population 9,532,560 | Casualty | Dead | 33,500 (0.3%) | 100 (0.0%) |
| | | Injured | 113,600 (1.1%) | 300 (0.0%) |
| Fire | Outbreak | | 500 | - |
| | Burnt area and building | Wind Speed 3m/s | 798 ha 42,100 buildings | - |
| | | Wind Speed 8m/s | 1,710 ha 97,800 buildings | |
| | Casualty | Wind Speed 3m/s | 7,900 (0.1%) | |
| | Wind Speed 8m/s | 18,300 (0.2%) | | |
| Bridge 213 (with detail inventory and stability analysis 189) Flyover 80 (with detail inventory and stability analysis 38) | Large possibility of falling-off | Bridge | 7 | 0 |
| | | Flyover | 0 | 0 |
| | Moderate possibility of falling-off | Bridge | 2 | 0 |
| | | Flyover | 0 | 0 |
| Water Supply Distribution Pipes Total 4,615km | Break of pipes or joints | 4000 points | 0 points | 200 points |
| Electric Power Transmission and Distribution Line Total 4,862km | Cut of cables | 30 km | 0 km | 4 km |
| PLDT Telephone Aerial Cable 9,445 km Underground Cable 3,906 km | Cut of cables | 95km | 0 km | 11 km |
| Public Purpose Buildings (Hospital 177, School 1412, Fire Fighting 124, Police 43, MMDCC Organizations and 17 LGU City and Municipal Halls 33) | Heavily Damaged | | 8 - 10% | 0 - 0.2% |
| | | Partly Damaged | 20 - 25% | 0 - 0.3% |
| Mid-rise and High-rise Buildings | 10-30 stories | 981 | Heavily Damaged | 11% |
| | | | Partly Damaged | 27% |
| | 30-60 stories | 119 | Heavily Damaged | 2% |
| | | | Partly Damaged | 12% |
| | | | 0.3% | 2.3% |
| | | | 0.3% | 9.2% |

Source: Study Team

Results from a Magnitude 7.2 Earthquake from the West Valley Fault :

- damage to approximately 38% of the residential buildings
- 38% of the 10-30 story buildings
- 14% of the 30-60 story buildings
- overall 30-35% of public buildings.

There is an estimated 33,500 deaths and 114,000 injuries. There will even be at least 7,900 additional casualties caused by fires.

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Objectives and Methodology

Problem

What social vulnerability issues arose in the context of the Metro Manila plans and how have they been addressed?

Objectives

1. Identify how social vulnerability issues have evolved in the context of the Metropolitan Land Use Planning and regulatory processes, and
2. Establish and identify how the Metro Manila land use planning has responded to social vulnerability issues and how these responses could further be enhanced by disaster management planning.

Methodology

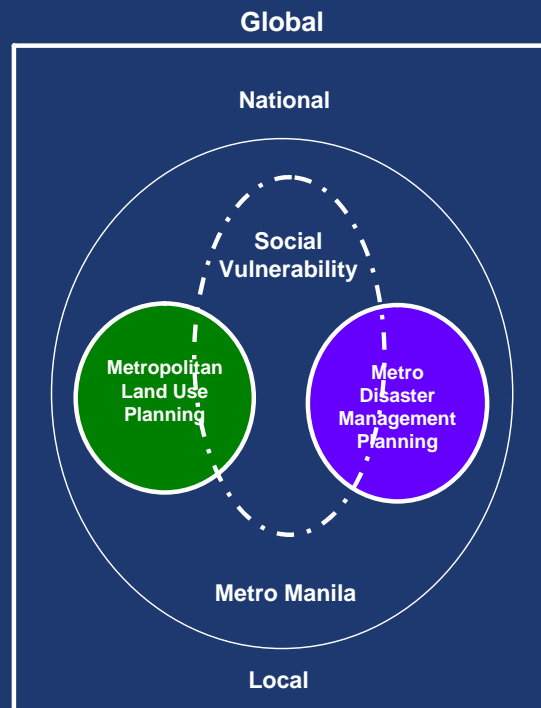
Policy Review

Interviews

Focus Group Discussion

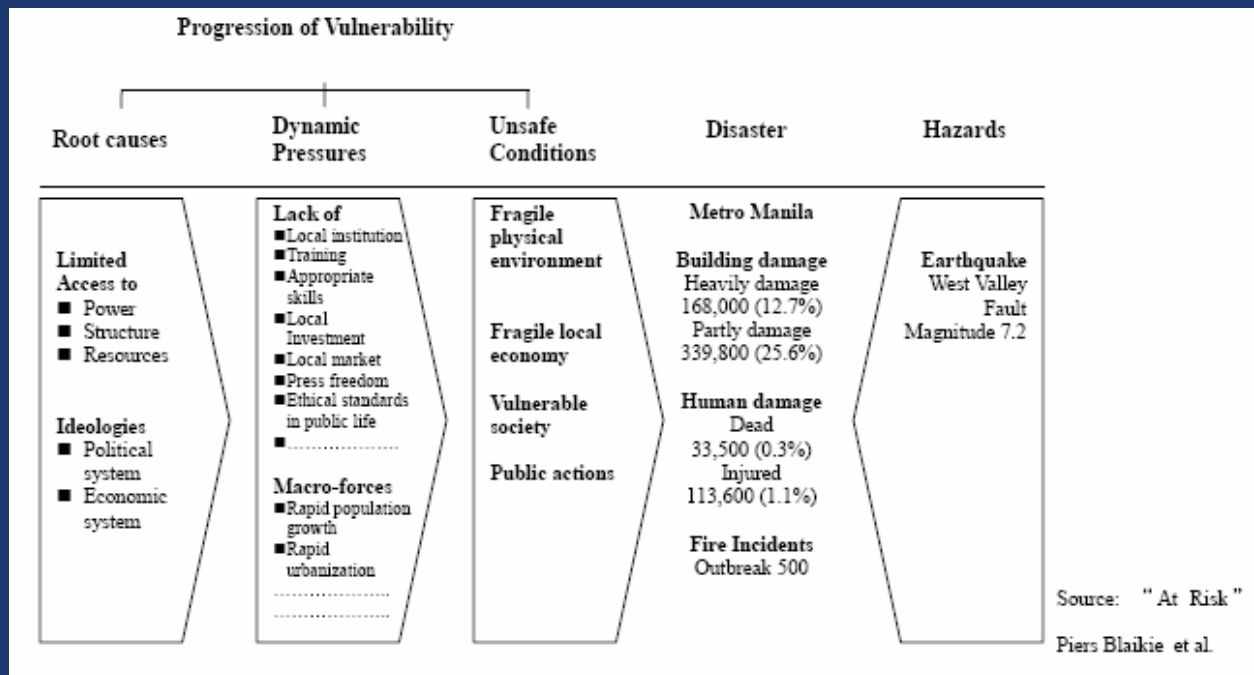
Content Analysis of the Land Use Plans of the component cities of Metro Manila

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Highlights of the Metro LUP & Metro DMP

| | Metro LUP | Metro DMP |
|-------------------|---|---|
| Year Accomplished | 1999 | 2004 |
| Timeline | 1996-2016 | 2005 onwards |
| Proponents | MMDA | MMDA, PHIVOLCS, JICA |
| Orientation | Urban development | Disaster Reduction |
| Character | Standard planning | Scientific |
| Mode of Analysis | Development constraints and opportunities | Risk assessment geological survey, social survey, building infrastructure survey, important public facilities survey, dangerous material treatment facilities survey, GIS database development, earthquake damage estimation, preparation of disaster management plan for Metropolitan Manila, community based disaster management activities |



Source: MMEIRS, 2004

Table 8.6.4 Applicability of Current CBDM Activities

| Bgy | Q: In your opinion, can the CBDM activities be applied in your barangay? |
|----------------------------------|---|
| Bgy 741 Manila City | It is for common good. |
| | People will be ready for any disaster to come. |
| | This is essential for the Brgy. |
| | This is essential for the people. |
| | If the chairman will not be influenced by politics, it will work. |
| | As long as transparency & coordination exist, it will be applicable. |
| Bgy Cupang Muntinlupa City | There exists a "thing" like that in our Barangay, especially in times of flood. People are always ready to have their motorboat lent to others, but this is not written in black and white. |
| | It could be done. Especially in places where there are numerous calamities, importantly the earthquake. This is important in preparedness. |
| | CBDM is important because there is a need for this so that the effects of calamity will be minimized. |
| | There is a need to organize this in the Barangay because it is a high-risk area. |
| Bgy Ugong Pasig City | It can be implemented. |
| | It can be done, in fact, something similar is now being done in the barangay. |

Table 8.6.5 Force Field Analysis

| Bgy | DRIVING FORCE | RESTRICTING FORCE |
|---------------------------|-----------------------------------|---|
| Bgy 741 Manila City | Strong leadership | Poor leadership |
| | Disaster experience | Lack of community involvement |
| | Funds | Lack of funds |
| | Perception from people | Unawareness |
| | Existence of Educators & trainers | Lack of interest |
| | Community cooperation | Dole-out mentality |
| | IEC | Overpopulation |
| | Preparedness | Poor access for infrastructures & communication |
| | Support from Local Gov. Unit | |

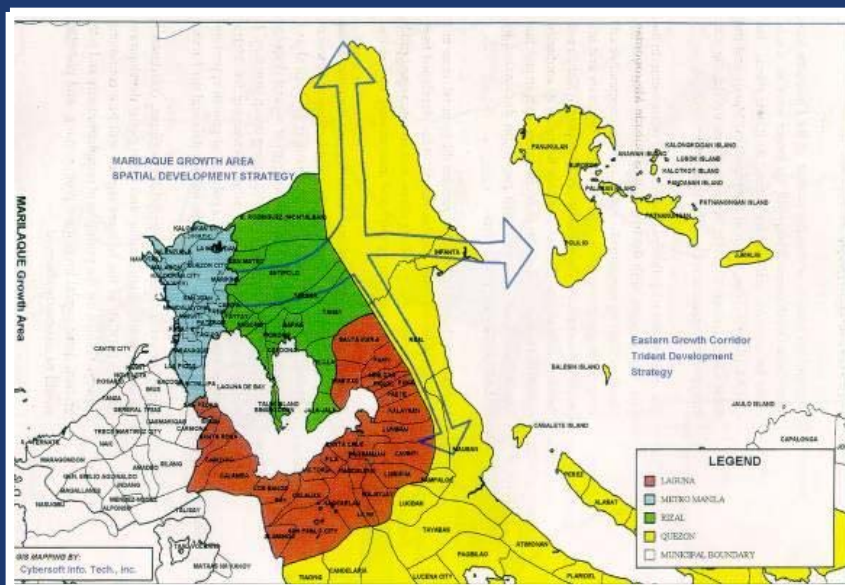
Source: MMEIRS, 2004

Table 8.6.6 Countermeasures for Enhancement and Mitigation

| Bgy | | Issues | Risk Reduction Measures |
|---------------------------|-------------------|---------------------------------|---|
| Bgy 741 Manila City | Driving Force | Strong Leadership | 1. Presentation of MMIERS to Community leaders and Barangay Assembly |
| | | Disaster Experience (1985 fire) | 1. identify people/residents who experience the disaster 2. let them talk (tell the stories) 3. film showing 4. disaster drills 5. exposure |
| | | Funds | 1. Utilize in priority disaster project |
| | Restraining Force | Poor Leadership | 1. Trainings |
| | | Community Participation | 1. Disseminate information of MMIERS 2. Conduct community meetings |
| | | Lack of Funds | 1. Generate funds thru solicitation fund drive & other means. |

Source: MMEIRS, 2004

Metro LUP Proposal





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Initial Results

- In the absence of the MMEIRS, Metro Manila will have to rely of the Metro LUP which would have continued an incomplete and incomprehensive “development” process which does not appreciate the urgency and grave threats that disaster risks have on its constituencies, structures, growth and development.
- Implementation of the Metro DMP could not have been initiated without external support (from other government agencies, local government and other partners).
- There is an absence of a consistent definition for social vulnerability to guide both plans that leads itself to being addressed adequately.

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Phase I: Land Use Planning at the Metropolitan Level

Phase II – LUP at the Local Level

Coverage: all component local government units within Metro Manila, to select case studies on LGU that have advanced in DRM and social vulnerability issues.