

# Increasing Disaster Resilience through Land Use Planning in Megacities: The Case of Fault Zoning in Muntinlupa City, Metro Manila, Philippines

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## Background

Nowhere is disaster risk more felt than in the world's large urban agglomerations and megacities. Megacities are more vulnerable to threats from natural, environmental and technological hazards, not only due to increased concentrations of people in areas exposed to hazards, but also due to the increasing dependence of complex, modern society on infrastructures, lifelines, and institutions. Indeed, cities have absorbed nearly two-thirds of the global population explosion since 1950 and are currently growing by a million people each week. The population of the global countryside has peaked and will begin to decline after 2020. On the other hand, global urban growth is at 1.8 percent. Eventually, cities will account for all future global population growth. And most of this growth will happen in urban agglomerations in the developing world. Cities in more developed countries (MDCs) will grow at the rate of 0.38 percent, a doubling time of 185 years, while cities in less developed countries (LDCs) will double their size in just 29 years.

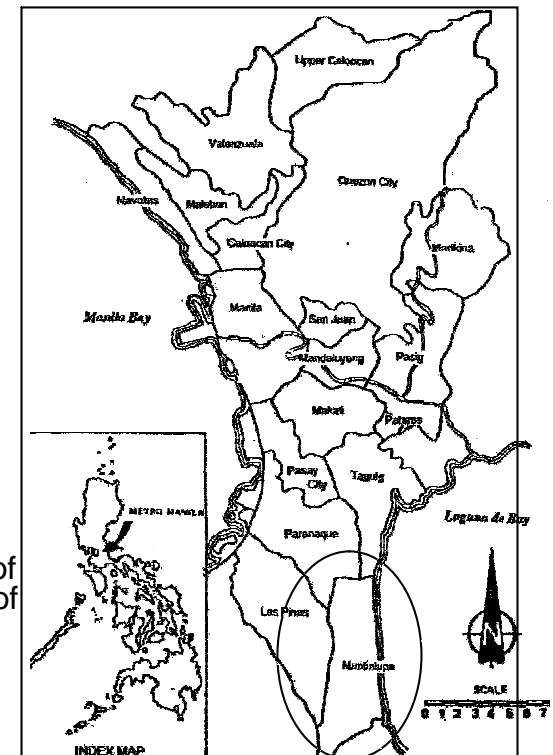
## The Primacy of Metro Manila

Metro Manila is the hub of the Philippines' economic, political, social, and cultural life. As the economic nerve center, it accounts for the bulk of the country's economy with 32 percent share of the national GDP and grows at a rate of 5.5 percent. It is composed of its culturally diverse population of over 10 million represent about one-fourth of the country's urban population and 13 percent of the national population. It is composed of 15 cities and 2 municipalities. At the metropolitan level, there is Metro Manila Development Authority that deals with metro-wide concerns. Metro Manila's primacy in many respects only emphasizes its role as the foremost growth center and leading engine of progress in the country.

## Creeping Faults in Muntinlupa City

Muntinlupa is one of the fastest growing cities in Metro Manila. With a total land area of 47 square kilometers, it is home to 379,310 residents (78,016 households) or a population density of about 8,000 persons per sq.km.in 2000.

In 1994, several industrial companies complained about severe cracks on walls and floors. Government geologists mapped and recognized the linear depression in the city as a result of fault creep. A 2.6 km ground rupture was mapped and additional 17 ground fissures (length of 50 m to 1.4 km) trending north-northeast were recognized by 1999. Movements along the fissures were mostly vertical ranging from 12 cm to 116 cm (average of 50 cm). Left-lateral, horizontal displacement reached 0.25 m. These are all consistent with the characteristics of the West Valley Fault, the master faults which could be facilitating the vertical and horizontal movements.



The WVF transects the cities of Marikina, Quezon City, Pasig, Makati and Taguig. The fissures appear to be tectonically-controlled, although overextraction of ground water cannot be ruled out. Ground deformation and subsidence have substantially damaged hundreds of residential and industrial structures, roads, and railroad track due to breakage, tilting, and rotation along the fault's deformation zone.

### From Policy to Practice?

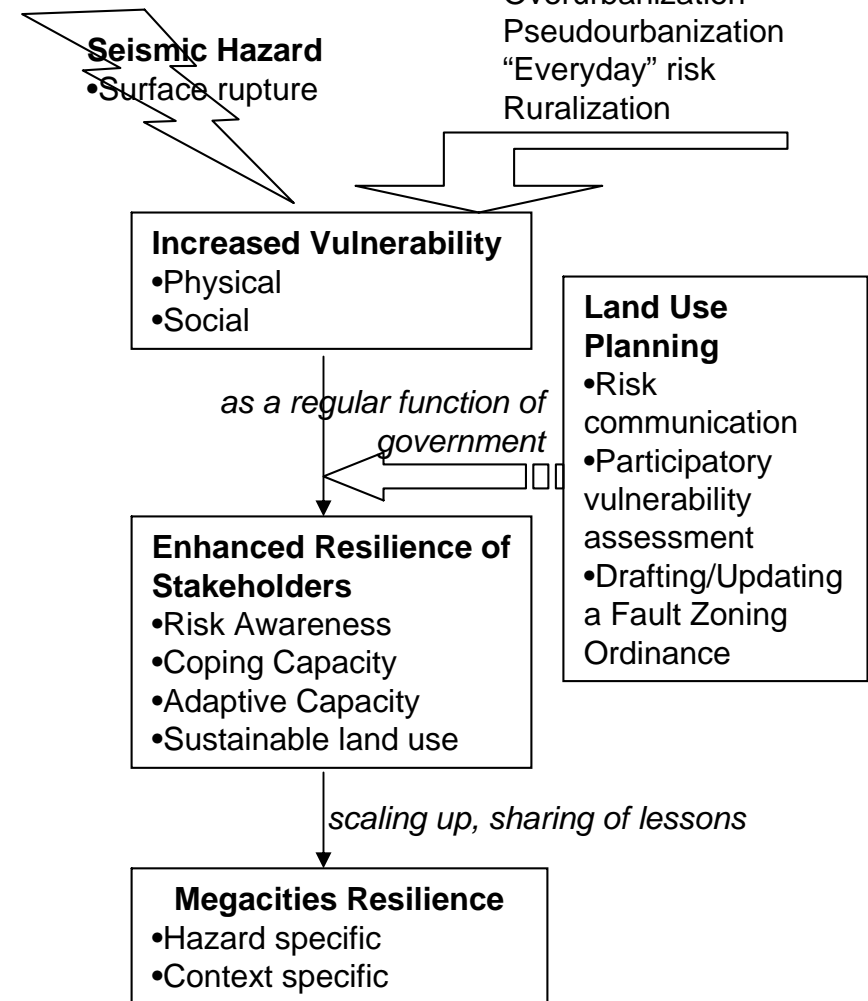
Muntinlupa City responded by enacting a Fault Zoning Ordinance in 1998. However, most, if not all, of the provisions of the ordinance have not been implemented. Majority of respondents are unaware of the ordinance. Interviews with key informants likewise pointed to lack of communication between the city government and the stakeholders and the lack of citizen participation in the policy-making process.

### Increasing Urban Resilience Through Land Use Planning

As a regular function of government, the power and authority of land use planning can reduce vulnerabilities, decrease existing risk, and prevent further accumulation of risk. Land use planning thus becomes a strategic non-structural approach to disaster risk reduction. In a complex urban setting like Muntinlupa, who are the vulnerable groups and what are their common characteristics? Are there varying levels of social vulnerability among these various groups? How should risk be communicated to such groups?

Land use planning in cities in more recent years seeks to be bottom-up and more participatory. What innovative participatory social vulnerability methods can be used to mainstream risk parameters in land use planning? How can participatory methods be applied in the urban context to make land use plans and policies more responsive to socially vulnerable groups and enhance their implementability? This study seeks to find ways to enhance the planning process through participatory approaches and risk communication techniques, as a means to increase urban resilience and achieve sustainable land use. Scaling up of lessons learned of Muntinlupa in their experience in fault zoning and applying them in the megacity context may eventually lead to megacities resilience, because cities may be crucibles of risk but can also be agents of progress.

### Conceptual Framework



Fault creep triggers the creeping disaster. Vulnerable populations due to their location or proximity to the hazard of surface faulting, type of structure, occupancy load, income, and age are susceptible to damage or losses. Land use planning that cascades down risk communication to vulnerable groups and incorporates participatory vulnerability assessment to craft a fault zoning ordinance enhances the implementability of the land use policy and turn it into regular practice, resulting to enhanced urban resilience. Scaling up of lessons from the Muntinlupa case to other cities cut by the West Valley Fault will lead to a higher level of resilience or desire of people to continue urban life.