Metro Manila City Profile

Climate and Disaster Resilience

Caloocan Las Piñas Makati Malabon Mandaluyong Manila
Marikina Muntinlupa Navotas Parañaque Pasay Pasig
Pateros Quezon City San Juan Taguig Valenzuela

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METROPLANADO
Metro Manila Planning and Development Officers' Association, Inc

About the Initiative

The Climate and Disaster Resilience Initiative (CDRI) is an umbrella initiative of Kyoto University, funded by the Global Center of Excellence (GCOE) Program "Human Security Engineering for Asian Megacities," which has research, education, training, and implementation components. The current program was developed in cooperation with Metroplanado, the association of Planning Officers of the local governments of Metro Manila. City data were collected through questionnaire survey. The cooperation and inputs from all the cities listed here are highly appreciated.

Team Members

Kyoto University

Rajib Shaw
Yukiko Takeuchi
Glenn Fernandez

Metroplanado

Anthony Xenon Walde
Anna Rose Caro

CDRI Action Planning Workshop Participants

Jonathan Himala (Caloocan)
Armando Aguilar (Las Piñas)
Alfred Pascual (Las Piñas)
Edwin Aguilar (Makati)
Reyne June Bawisan (Makati)
Hector Reyes (Makati)
Ronnie Flores (Malabon)
David Cipriano (Malabon)
Gloria Tabuyo (Mandaluyong)
Ma. Anna Mae Esmana (Mandaluyong)
Ethel Roxanne Salvador (Muntinlupa)
Karla Marie Vasquez (Muntinlupa)
Benigno Rivera (Parañaque)
Merlita Lagmay (Pasay)
Ma. Teresa Castillo (Pasay)
Yolanda Estanislao (Quezon City)
Jennifer Concepcion (Quezon City)
Alfredo Garcia (San Juan)
Albert King (San Juan)
Bernadette Jalbuena (Taguig)
Fortune Angeles (Valenzuela)
Antonio Pagsanjan (Valenzuela)

Contact Details

Rajib Shaw
Associate Professor
International Environment and Disaster Management Laboratory
Graduate School of Global Environmental Studies
KYOTO UNIVERSITY
Yoshida Honmachi, Sakyo-ku, Kyoto 606-8501, JAPAN
Telefax: +81-75-753-5708
E-mail: shaw@global.mbox.media.kyoto-u.ac.jp
Website: http://www.iedm.ges.kyoto-u.ac.jp/

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Background and Targeted Issues

Rapid Urbanization Leads to High Vulnerability in Cities

In recent years several studies have focused on coastal megacities, as they concentrate a significant part of the world's human population and critical economic assets in potentially hazardous locations. Metro Manila is one of these megacities, where even "regular" disasters affect a large number of people. The rapid pace of urbanization, coupled with an ever-increasing population burden, has significantly increased the overall vulnerability of urban agglomerations to natural disasters.

By 2050, the world population is expected to reach 9 billion people. Large numbers of people will be concentrated in megacities and on fragile lands, making reduction of vulnerability to disasters in metropolitan areas a critical challenge facing development. Unmanaged rapid urban growth strains the capacity of national and local governments to provide even the most basic of services such as health, food, shelter, employment, and education. The challenge then is for the national government and most especially the local governments to develop effective policies, programs, and strategies that will help them manage urbanization to ensure development.

In the Philippines, rapid urbanization has occurred only in the last four or five decades, when many rural dwellers trooped to urban centers such as Metro Manila and Metro Cebu in search for the proverbial good fortune and good life. Cities provide countless opportunities for economic development. Urban areas serve as the industrial, commercial, and administrative centers in the different regions of the country. Urban centers also represent availability and accessibility to various services and facilities. Often, however, urbanization is occurring at such a rapid pace that cities are not able or not equipped to manage the attendant concerns.

Climate Change Presents Additional Challenges to Cities

Climate change will increase the hazard potential in many cities. Although climate change will affect everyone, developing countries like the Philippines will be hit hardest and soonest and will have the least capacity to respond. Climate change is happening now in the Philippines and the rest of Southeast Asia, and the worst is yet to come. The frequency and intensity of extreme weather events have also increased in recent years. This includes a significant increase in the number of heavy precipitations events and an increase in the number of tropical cyclones. Last year these climatic changes have led to massive flooding in many parts of the region, like the Philippines, Vietnam, Cambodia, and Thailand, causing extensive damage to property, assets, and human life, especially in the cities.

Throughout history, cities have adapted to climate variability, but the intensity and pace of the present and forthcoming climate changes induced by the continued and ongoing emission of greenhouse gases are already and will increasingly be a major challenge to many of them. Urban communities are dependent upon the infrastructure that supplies them with essential services such as clean water, waste management, electricity, transportation, and telecommunications. Climate change threatens this critical infrastructure and they must be protected. If not addressed adequately, climate change could seriously impede the sustainable development of cities and their poverty eradication efforts.

CDRI as a Tool in Helping Cities Build Disaster Resilience

In 2009, the Climate and Disaster Resilience Initiative (CDRI) used the Climate Disaster Resilience Index (CDRI also) to assess the existing level of climate disaster resilience of 15 cities across Asia: Banda Aceh, Indonesia; Bangkok, Thailand; Colombo, Sri Lanka; Danang, Vietnam; Dhaka, Bangladesh; Hanoi, Vietnam; Ho Chi Minh, Vietnam; Hue, Vietnam; Iloilo, Philippines; Makati, Philippines; Mumbai, India; San Fernando (La Union), Philippines; Sukabumi, Indonesia; Suwon, South Korea; and Yokohama, Japan. The cities' resilience was evaluated only against climate-related natural hazards, like typhoons, flooding, sea-level rise, rainfall-induced landslides, heat wave, and drought.

Since disaster resilience is a function of a diverse set of indicators, CDRI measures climate disaster resilience by considering five dimensions: physical, social, economic, institutional, and natural. Each dimension has five parameters (see Table 1) and each parameter in turn has five variables. Therefore, all in all, the CDRI questionnaire has 125 questions. But although efforts are made to make CDRI as holistic as possible, it is by no means an exhaustive assessment but summarizes instead some of the more significant and relevant variables. In addition, at the end of each parameter and dimension, survey respondents are requested to assign weights to the variables and parameters in order to reflect the priorities of the cities and the relevance of the indicators to the local situation. Using data collected from the questionnaire surveys, we used Weighted Mean Index (WMI) method and Aggregate Weighted Mean Index (AWMI) to compute the scores for each parameter and dimension, respectively. The CDRI of the city is the simple average of the indexes of the five dimensions. The index value ranges from 1 to 5. Higher CDRI values are equivalent to higher preparedness to cope with climate change and disasters. Needless to say, these results are not absolute values, but serve mainly as broad policy guidance. The quality of the results is very much dependent on the quality of the input data from the survey respondents.

Based on the results, the strengths and weaknesses of the cities in each of the five dimensions are highlighted. Then policy points and recommendations are suggested to provide encouragement of city governments' engagements in specific institution and capacity building. Not only are outputs from this study useful for city governments, but they also provide valuable knowledge and information to other local and national stakeholders having a similar target: the enhancement of community resilience.

Graphs are provided to help in visualizing the analysis results and to facilitate comparison between dimensions and between cities. One graph shows the city's overall resilience and five other graphs demonstrate the city's resilience in terms of the physical, social, economic, institutional, and natural aspects.

Physical	1. Electricity (access, availability, supply, dependence on external supply, alternative capacity) 2. Water (access, availability, supply, dependence on external supply, alternative capacity) 3. Sanitation and solid waste disposal (access to sanitation, toilets, collection of wastes, waste treatment, recycling) 4. Accessibility of roads (transportation network, paved roads, accessibility during normal and catastrophic flooding, roadside covered drains) 5. Housing and land-use (building codes, non-permanent structures, houses above water logging, house ownership, population living in proximity to polluted industries)
Social	1. Population (annual growth rate, population under 14 and above 65, population of informal settlers, population density) 2. Health (population suffering from waterborne/vector-borne diseases, access to health facilities, functionality and capacity of health facilities, preparedness for disasters) 3. Education and awareness (literacy rate, awareness of disasters, availability of public awareness programs/ disaster drills, access to the Internet, functionality of schools after disasters) 4. Social Capital (participation in community activities and clubs, ability of communities to build consensus and to participate in city's decision-making process, mixing and interlinking of social classes) 5. Community preparedness during a disaster (preparedness in terms of logistics, materials, and management; participation in relief works; provision of shelter for affected people; support from NGOs/CBOs; population evacuating voluntarily)
Economic	1. Income (population below poverty line, number of income sources, households dependent on only one income source, income disparity, income derived from informal sector) 2. Employment (unemployment in formal sector, youth unemployment, women employment, workers coming from outside the city; employment in the informal sector) 3. Household assets (households with television or radio, phone, motorized vehicle, non-motorized vehicle, basic furniture) 4. Finance and savings (availability of credit facility to prevent disasters, accessibility of credit facility to urban poor, savings of households, household's insured properties, existence of disaster risk financing instruments) 5. Budget and subsidy (city' annual budget for DRR and CCA, availability of subsidies to rebuild houses, alternative livelihood, health care after a disaster)
Institutional	1. Mainstreaming of DRR and CCA (mainstreaming in city's land-use plans, housing policies, school education curriculum, transport policies, environmental plans) 2. Effectiveness of city's crisis management framework (existence of disaster management plan, incorporation of climate change uncertainties, effectiveness of emergency team during and after a disaster, readiness of alternate decision-making personnel) 3. Effectiveness of city's institutions to respond to a disaster (formal and informal institutions, trained emergency workers, disaster training programs, learning from previous disasters) 4. Institutional collaboration with other organisations and stakeholders (dependence on external institutions; collaboration with neighbor cities, national government, NGOs, private organizations) 5. Good governance (implementation of DRR plans, accountability and transparency of city government, implementation of building codes, effectiveness of early warning systems, frequency of disaster drills
Natural	1. Intensity/severity of natural hazards (floods, typhoons, rainfall-induced landslides, heat waves, droughts) 2. Frequency of natural hazards (floods, typhoons, rainfall-induced landslides, heat waves, droughts) 3. Ecosystem services (quality of urban biodiversity, soil, air, and water; urban salinity) 4. Land-use in natural terms (area vulnerable to climate-related hazards, urban morphology, settlements in hazard-prone areas, available urban green space, loss of urban green space in last 50 years) 5. Environmental policies and food security (compliance to environmental policies, existence of environmental preservation policies, waste management system, reduction of air pollution, food supply during disasters)

Table 1: Dimensions and Parameters of CDRI

In this present study, CDRI is again used to evaluate the current level of climate disaster resilience of the 16 cities and 1 municipality of Metro Manila, one of the largest urban agglomerations in the world. The survey respondents were the Planning Officers of each city of Metro Manila. The distribution of the questionnaire was facilitated by the secretariat of the Metro Manila Planning and Development Officers' Association (Metroplanado).

By applying a holistic approach considering five dimensions to address disaster risk reduction (DRR) and climate change adaptation (CCA) and by facilitating action planning, it is hoped that this initiative can make a contribution in helping cities and residents of Metro Manila become more resilient when disaster strikes and better able to protect their lives, livelihoods, and assets.

METRO MANILA

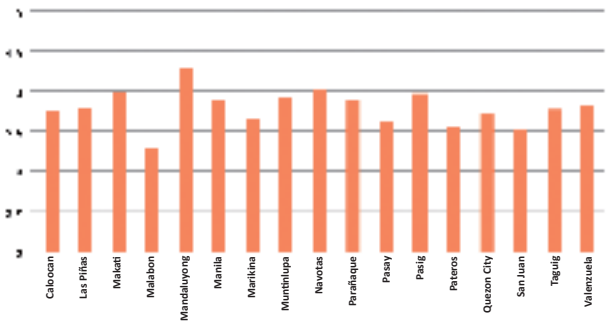
Profile and Overall CDRI

According to a 2009 publication of the Worldwide Fund for Nature (WWF), among the coastal mega-cities of Asia, Metro Manila, Philippines tied with Jakarta, Indonesia as the second most vulnerable to climate change, after Dhaka, Bangladesh. In the comparison of exposure to climate impacts, Metro Manila is the most at risk of the 11 mega-cities examined by WWF, largely because of its exposure to tropical cyclones and flooding.

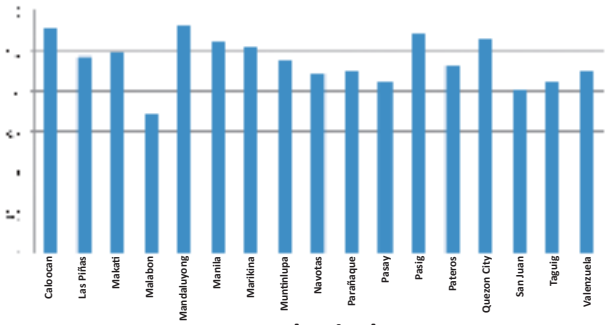
Metro Manila, also known as the National Capital Region, is one the largest urban agglomerations in the world. This rapidly growing urban center continues to attract people from all the other regions of the country. Its land area (638.55 sq km) is approximately just 0.21% of the entire Philippines. Based on the 2007 census, the total population of Metro Manila is 11,553,427, which accounts for 13% of the country's total population. The population of Metro Manila is predominantly young. Approximately 30% are between 0-14 years old, while around 5% are 65 years old and above. The economic reproductive age ranging from 15 to 64 years old accounts for around 65%. The average household size is 5.

As a rapidly urbanizing region, Metro Manila is faced with many challenges. Its unplanned growth in response to socioeconomic demands and rapid population growth due to migration and births have increased pressures on the capacity of the region and in the delivery of basic services, health among others. These are manifested in urban challenges that Metro Manila faces such as traffic, housing, unemployment, communicable and non-communicable diseases, pollution, garbage, and peace and order. Being the political, economic, social, and cultural center of the Philippines, the protection of Metro Manila cities from climate-related disasters is of utmost importance. Development gains are being jeopardized by increasing losses due to hydro-meteorological disasters.

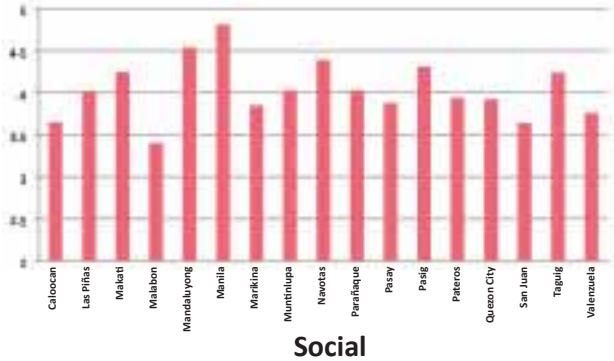
Based on the CDRI computed from the questionnaires filled out by Planning Officers, Metro Manila has high physical (4.35), institutional (4.20) and social (4.01) resilience and moderate natural (3.15) and economic (3.14) resilience. Its overall CDRI is 3.77 out of a perfect score of 5. Below are the overall CDRI of each of the 16 cities and 1 municipality (hereinafter referred collectively as the cities) and their score in each of the five dimensions assessed in this study.



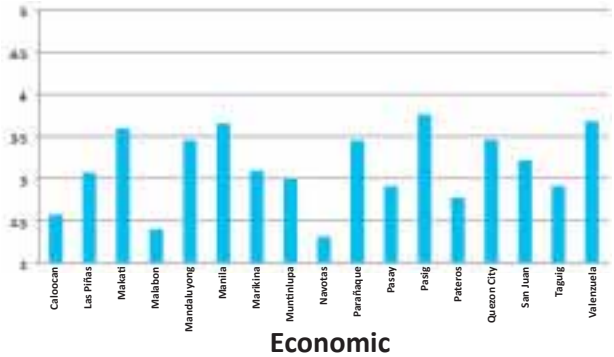
Overall



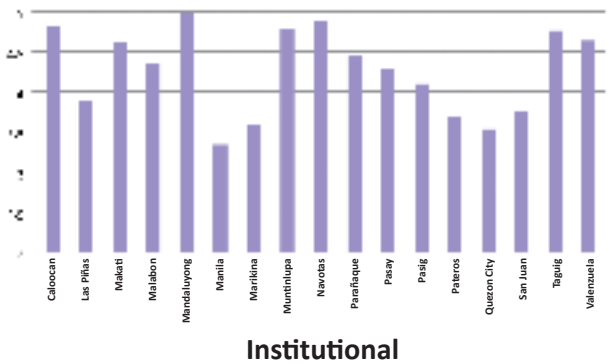
Physical



Social



Economic



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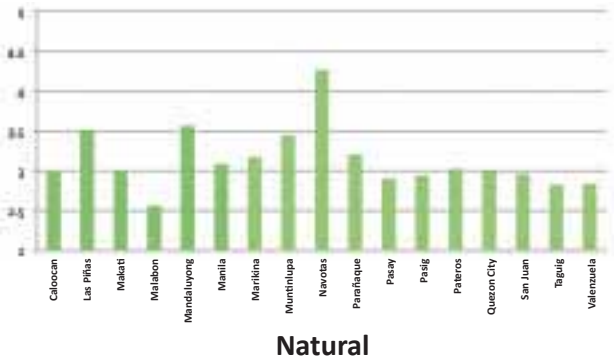


Natural

From the questionnaires, it was observed that there are variables consistently rated either very high or below low by the Planning Officers. The variables with the high ratings (with average equal to or greater than 4.75 out of 5) can be considered the strengths of the cities while those with low ratings (with average less than 2.00 out of 5) the weaknesses of the cities.

Variaable	Rating
2.1.1 Percentage of the city population with legal access to electricity from electric companies	4.94
2.1.2 Status of power supply interruption (Status of daily availability of electricity)	4.88
2.1.3 Electricity supply authority capable to supply the city's demand for electricity	4.88
2.2.1 Percentage of city population with legal access to potable water supply	4.81
2.3.3 Collection of solid waste produced per day	4.81
3.2.1 Percentage of city dwellers that suffer from waterborne or vector-borne diseases every year	4.75
6.1.3 Intensity/severity of rain-induced landslides	4.75

Table 2. Variables rated VERY HIGH by the Planning Officers

Variable	Rating
3.1.5 Maximum urban population density (day or night) per square kilometer	1.13
6.2.2 Frequency of Typhoons	1.44
6.4.2 Intensity of land-use – urban morphology (level of urbanization; extent of urbanized areas)	1.75
6.2.1 Frequency of Floods	1.75

Table 3. Variables rated VERY LOW by the Planning Officers

Similarly, it was observed that there are variables consistently ranked either very high or below low, according to their perceived importance to the cities. The variables with high ranking (with average greater than 4.20 out of 5) are the variables that are most important to the cities while those with low ranking (with average less than 1.50 out of 5) the variables that are least important to the cities.

Variable	Rating
4.1.1 Percentage of the city's population that live below the poverty line	4.59
6.1.1 Intensity/severity of floods	4.56
5.2.1 Existence and effectiveness of the city's disaster management plan	4.39
6.2.1 Frequency of floods	4.33
4.3.1 Percentage of the city's households that have television or radio	4.28
5.5.1 Integration and implementation of disaster risk management plans/policies	4.22

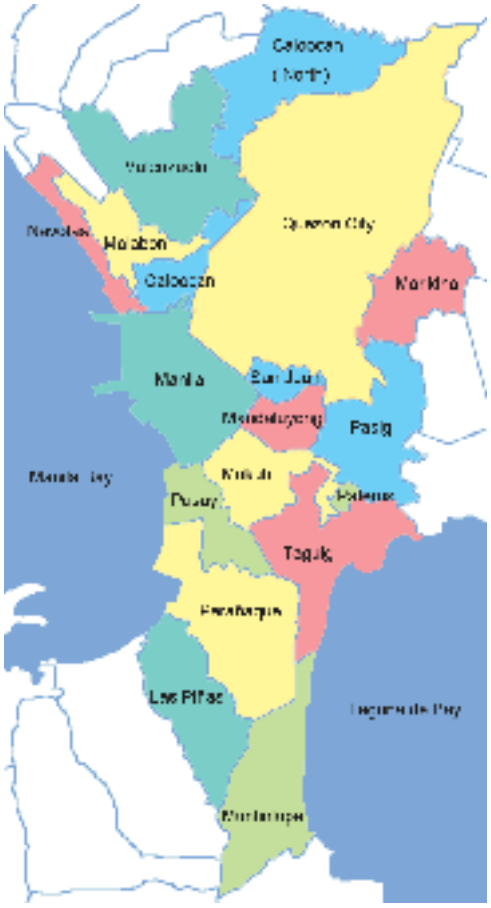
Table 4. Variables ranked VERY HIGH by the Planning Officers

Variable	Rating
3.3.4 City's average population that has access to the Internet at home	1.22
4.3.4 Percentage of city's households that have non-motorized vehicle (e.g., bicycle)	1.33
2.2.4 City's water supply dependent on external provision (e.g., from other cities/areas) during most frequent disasters	1.39
2.1.4 City's electric supply dependent on external provision (e.g., from other cities/areas) during most frequent disasters	1.41
6.1.4 Intensity/severity of heat waves	1.44
3.4.5 Extent that social classes mix and interlink with each other (opposite: social segregation)	1.44

Table 5. Variables ranked VERY LOW by the Planning Officers

The need for disaster resilience strategy not just for Metro Manila but for the entire Philippines has been underscored by a series of hydro-meteorological disasters in 2009, most notably Typhoon Ondoy (Ketsana) and Typhoon Pepeng (Parma). Cities play an important role in tackling disaster risk reduction (DRR) and climate change adaptation (CCA) by thinking globally and acting locally. The local leaders are in a position to deliver results. If properly empowered and equipped, the city leaders can take the required customized actions within cities that can lead to substantial reduction of disaster losses, in lives as well as assets of communities.

Cities differ from each other in terms of priorities and long-term needs such that in each city different sets of tasks need to be undertaken ahead of others. Cities and their residents must participate actively in disaster risk reduction. They must have a stake in protecting themselves and not just leave the job to the national government. Thus, aside from reporting the current level of climate disaster resilience of the cities of Metro Manila and their performance in the physical, social, economic, institutional, and natural dimension, there is a section on policy implications in relation to the Hyogo Framework of Action (HFA) at the end of each city report. This portion lists some suggestions for localized implementation of the five priorities for action: making disaster risk reduction a priority (Governance), improving risk information and early warning (Risk Assessment and Early Warning System), building a culture of safety and resilience (Knowledge Management), reducing the risks in key sectors (Vulnerability Reduction), and strengthening preparedness for response (Disaster Preparedness). It is hope that this report can be a catalyst for initiating action and delivering meaningful results at the city level. The list is admittedly not exhaustive but should be useful enough in providing a starting point for the cities.



	Area (sq km)	Population (2007)	Population Density	Annual Population Growth Rate
Caloocan	53.33	1,378,856	25,855	2.20
Las Piñas	41.54	532,330	12,815	1.65
Makati	27.36	510,383	18,654	1.91
Malabon	15.76	363,681	23,076	0.98
Mandaluyong	11.26	305,576	27,138	1.29
Manila	38.55	1,660,714	43,079	0.68
Marikina	33.97	424,610	12,500	1.14
Muntinlupa	46.70	452,943	9,699	2.48
Navotas	10.77	245,344	22,780	0.87
Parañaque	47.69	552,660	11,589	2.88
Pasay	19.00	403,064	21,214	1.77
Pasig	31.00	617,301	19,913	2.80
Pateros	2.10	61,940	29,495	1.05
Quezon	161.12	2,679,450	16,630	2.92
San Juan	5.94	124,187	20,907	0.87
Taguig	47.88	613,343	12,810	3.82
Valenzuela	44.58	568,928	12,762	2.21
Total	638.55	11,553,427	18,093	2.11

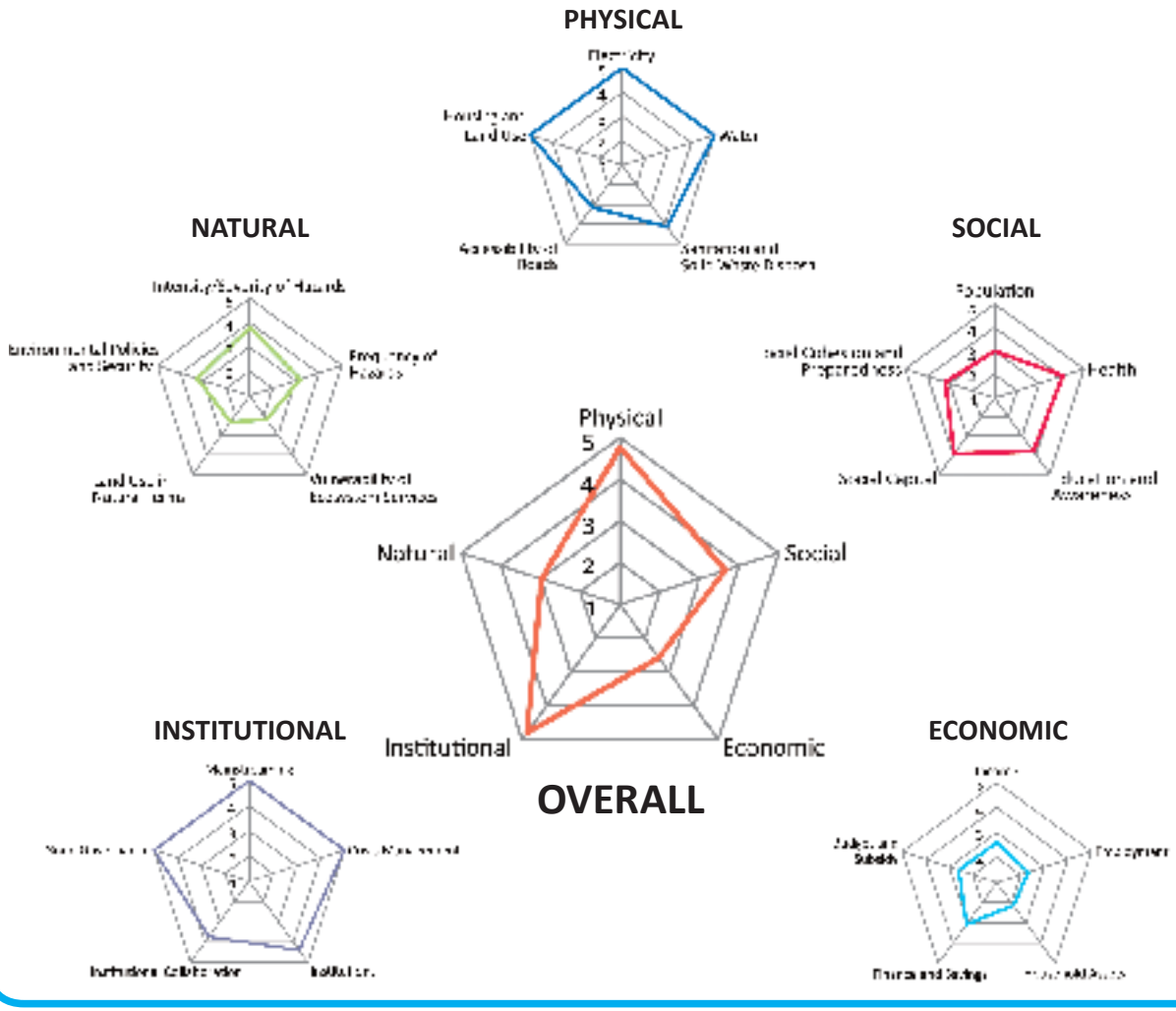
Table 6. Demographics of Metro Manila (2007 Census)

CALOOCAN CITY

City Profile and Overall CDRI

Caloocan is the second largest city in Metro Manila in terms of land area and third in terms of population. The World Bank and the International Finance Corporation have named Caloocan City among the most business-friendly cities in the Philippines. Caloocan holds the distinction of being the Second Cleanest City in Metro Manila, Marikina being the first. Caloocan has received the "Out of the Box" Award from the Mother Earth Foundation for efforts and innovative solutions in ecological solid waste management. According to its Mayor, in terms of public service, Caloocan is perhaps among the fastest to respond and the most sensitive to the needs of the public. This is because it has an efficient instant feedback mechanism in the form of text messaging, which is seldom done in most cities. Overall, Caloocan has high physical and institutional resilience; moderate social and natural resilience; and low economic resilience.

Analysis Result



Physical

Caloocan has the second highest physical resilience among the cities of Metro Manila, after Mandaluyong. Like most cities of Metro Manila, Caloocan scored very high in the Electricity and Water indicators. It also scored very high in Housing and land use. But the city scored low in the percentage of the city's land used as transportation network and in the percentage of the city accessible by paved roads (asphalt or concrete roads), most probably because the city's land area is quite large and some areas have not been developed.

Social

Caloocan has a low score in the following two parameters: Population and Social cohesion and preparedness before a disaster. This is why it has the third lowest social resilience among the cities of Metro Manila. The percentage of the city's population that is under 14 years old is around 35%, translating to a highly vulnerable population. This is aggravated by the fact that the city's population density is very high at 25,855 per square kilometer. In addition, it is estimated that less than 25% of people affected by a disaster are willing to evacuate voluntarily.

Economic

Its low score in Employment and in Household assets caused Caloocan to have the third lowest economic resilience among the cities of Metro Manila. A high percentage of the employable youth doesn't have jobs in the formal sector. And it is estimated that many households still don't possess television or radio, which are very important in getting news on impending typhoons and other hydro-meteorological hazards. The city's budget for climate change related disaster risk reduction measures is deemed insufficient.

Institutional

Caloocan has the third highest institutional resilience among the cities of Metro Manila, after Mandaluyong and Navotas. It rated very high in 3 out of 5 parameters: Mainstreaming of disaster risk reduction and climate change adaptation, Effectiveness of city's crisis management framework, and Good governance. In 2009, the city lined up preparedness exercises for the observance of the National Disaster Consciousness Month in July. The activities included a simulated earthquake and fire drill, water search and rescue (WASAR) capability demonstration, basic life support training, symposium and information drive on disaster preparedness, and coastal clean-up drive.

Natural

The natural resilience of Caloocan is quite low. It has a low score in Vulnerability of ecosystem services and in Land-use in natural terms. It has poor urban air quality and the percentage of total urban green space (parks, trees, forests, etc.) to the total area of the city is low. In Caloocan severe flooding are for long the major cause of disasters. Flooding mostly comes from river overflow, excessive rainfall, and inadequate channel capacity of river systems. Another significant cause of flooding in Caloocan is land development consequences. Rapid development of urban settlements causes the replacement of vegetated and forested areas with concrete and other non-permeable pavements. Moreover, the increase of the population also brought the accumulation and disposal of garbage to water streams that contribute extensively to worsening of flood problems.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

Caloocan already has a high institutional resilience (4.80 out of 5). But it must still continue mainstreaming DRR and CCA into its plans and programs. The local government should work on increasing the city's institutional collaboration with internal and external organizations. The collaboration and cooperation among stakeholders, including NGOs, will be crucial in order to improve the disaster resilience of the 188 barangays (villages) of Caloocan.

2. Improving risk information and early warning

Identifying at-risk communities to different hazards should be a priority of the city. It must also seek continuous improvement in its early warning systems for floods and typhoons. Increasing the city's annual budget targeting disaster risk reduction will facilitate these activities of gathering and disseminating important risk information. The city should support the efforts of national agencies, like the National Disaster Coordinating Council, in developing and improving databases related to hazards and disasters.

3. Building a culture of safety and resilience

Improving the residents' limited knowledge of threats and impacts of disasters is necessary, as evidenced by the unwillingness to evacuate voluntarily of those who are sure to be affected by disasters. This can be done by further enhancing public awareness programs and disaster drills (which already has a score of 5 out of 5). The resident's participation in community activities should also be increased.

4. Reducing the risks in key sectors

The city government should recognize the needs of vulnerable communities. Caloocan has a highly vulnerable population. It has high population density as well as a large young population. Poverty due to unemployment and underemployment negatively affects the coping capacity of the residents so it should also be high on the city's list of priority areas.

5. Strengthening preparedness for response

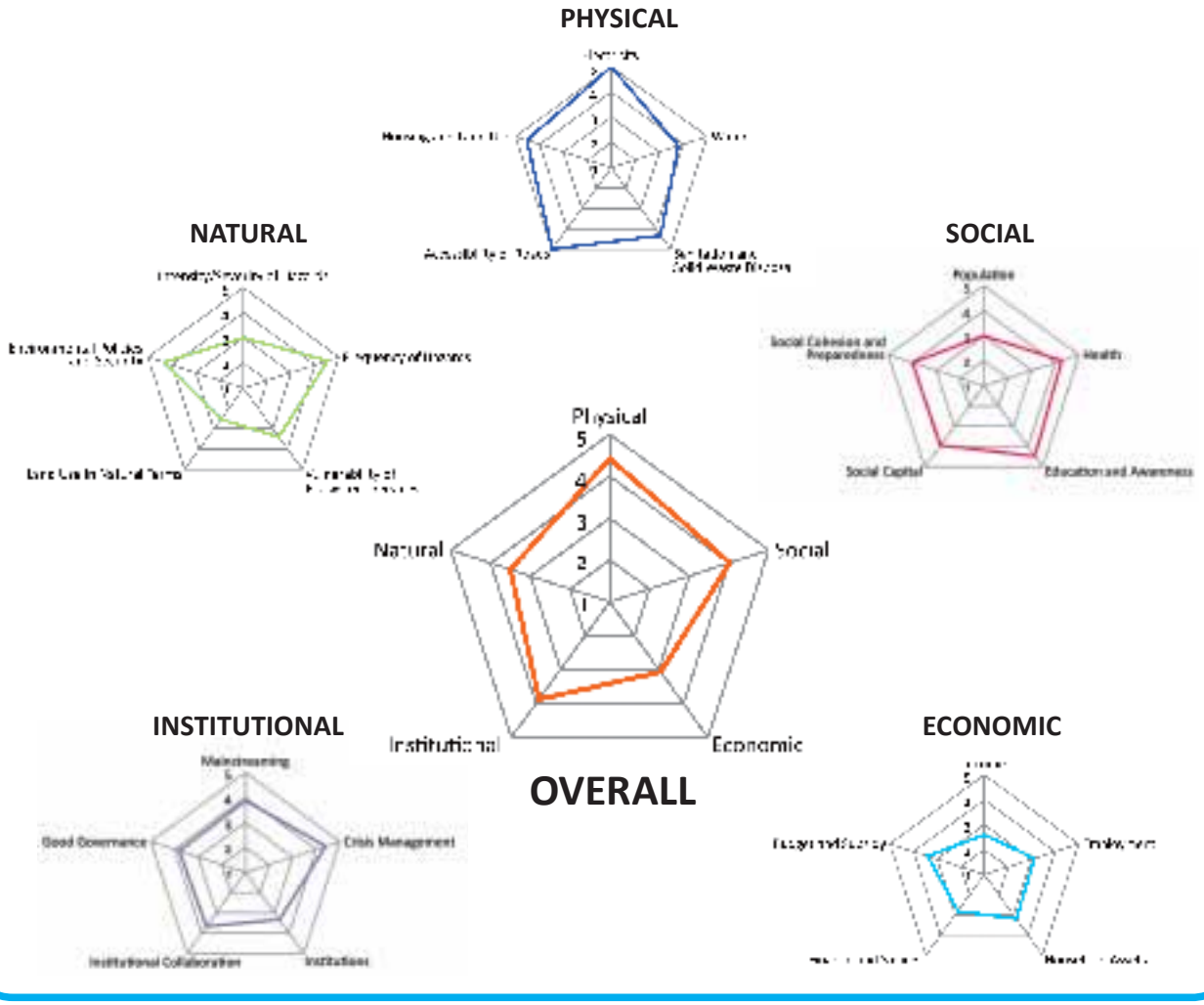
Caloocan should increase the number of its emergency workers to make the ratio of the number of residents per emergency worker reflect the large population of the city. It should also increase and improve training programs for emergency workers. Holistically addressing the poor to moderate performance of the city in the economic, social, and natural dimensions can positively impact the overall disaster preparedness of the city.

http://www.flickr.com/photos/jperthillave/3315791380/

City Profile and Overall CDRI

Las Piñas City, also known as one of the cleanest cities in Metro Manila, is in the list of the "Clean and Green Hall of Fame" awarded by the Philippine Government. It is also the first local government unit in the Philippines that has been honored with the prestigious Global 500 Roll of Honour of the United Nations Environment Programme (UNEP). These honors are in recognition of the city's outstanding achievements in the protection and improvement of the environment. Las Piñas has recently acquired the status "Most Competitive City" in the Philippines, together with Davao City, Makati City, Muntinlupa City, and Marikina City. But the city is not content on sitting on its laurels. It continues to launch new livelihood programs that double as environmental programs for its residents. Overall, Las Piñas has high physical and social resilience and moderate economic, institutional, and natural resilience.

Analysis Result



Physical

Las Piñas scored very high in Electricity and in Accessibility of roads. What it needs to focus on is the capacity of alternative emergency safe water supply system (water purification system, stored water, etc.), as deep wells sometimes get flooded and water pipes cut. Also, some studies show that seawater intrusion of aquifers is now becoming a serious problem due to the over pumping of deep wells in some coastal areas in Metro Manila, like Las Piñas.

Social

The population density of Las Piñas is 12,815 per square kilometer. The city has a large young population. Around one-third of the city's population are under 14 years old. The city also has its share of informal settlements, which makes the delivery of the city's health care more challenging. In 2002, according to the Metro Manila Urban Services for the Poor (MMUSP) Survey, 17% of the population of Las Piñas lived in depressed settlements.

Economic

A low score in Income and Finance and savings bring down Las Piñas' overall economic resilience. A high percentage of the city's population live below the poverty line and the residents have little access to disaster risk financing instruments. A large percentage of the city's population are engaged only in the informal sector, which is generally an unstable source of income. In 2002, 50% of the population lived in rented housing, 35% were home owners, and the remaining 15% were sharers.

Institutional

The city has a low score in the Effectiveness of city's institutions to respond to a disaster and in the Institutional collaboration with other organizations and stakeholders. This may be one of the reasons why there are calls to encourage subdivision and homeowners associations to join hands with barangay officials in the implementation of measures to address future disasters.

Natural

Due to rapid urbanization and development, Las Piñas has its own experience of flooding in some of its low-lying areas especially those near the bay, rivers, and creeks. This explains why Las Piñas has a low score in Land-use in natural terms and in Intensity/severity of natural hazards in the past 12 months. The intensity of land-use or urban morphology is high and there are numerous settlements located in hazard-prone areas. However such flooding lasts only for few hours or up to a day at most. Just recently, the abnormal increase in rainfall brought about by Typhoon Ondoy flooded some barangays near the Zapote-Las Piñas River but due to the city's continuous drive in its Clean and Green Program and the Sagip Ilog (Save the River) Project the water receded after a few hours in most parts as soon as the rain stopped. Among the cities of Metro Manila, Las Piñas has the third highest natural resilience in Metro Manila. Vacant lots, riverbanks, and waterways are considered by the city as "greenbelt areas."

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

Adequate resources are needed to implement DRR plans. The city should allocate additional budget for climate change related disaster preparedness measures. Mainstreaming of DRR and CCA activities means that these activities are properly linked to and coordinated with other planning initiatives and programs, such as those in the school curriculum, land use plans, housing policies, etc. The city's Environment and Sanitation Center (ESC) and the Clean and Green Council should intensify their citywide clean-up operation and zero-waste campaign. The city government should maintain its leadership in the celebration of such events as the International Earth Day.

2. Improving risk information and early warning

The city should identify at-risk communities in low-lying areas near Manila Bay, rivers, and creeks to get an accurate picture of the size of vulnerable communities. The local government should work on improving the early warning systems operated in flood-prone areas. Flood control efforts such as the Clean and Green Program and Sagip Ilog Program should be continuous.

3. Building a culture of safety and resilience

To improve the incorporation of DRR and CCA in the schools' curriculum and in extra-curricular activities, the city should coordinate with the city's division office of the Department of Education. It is important to enhance public awareness programs and disaster drills and to increase the residents' participation in community activities to continue raising people's awareness of climate change and its impacts. In Las Piñas, tree planting activities go full blast in June when all students will be required to plant and take care of a tree until they graduate, according to the city's PIO. Environmental awareness is also included in the students' subjects, and essay and painting contests and seminars are organized.

4. Reducing the risks in key sectors

Las Piñas must find alternative emergency safe water supply system to provide access to clean water even during and immediately after disasters. The city must address the poverty issue, especially the reliance of many residents on the informal sector for income. The practice of saving money should be encouraged. Access to disaster risk financing instruments should also be promoted.

5. Strengthening preparedness for response

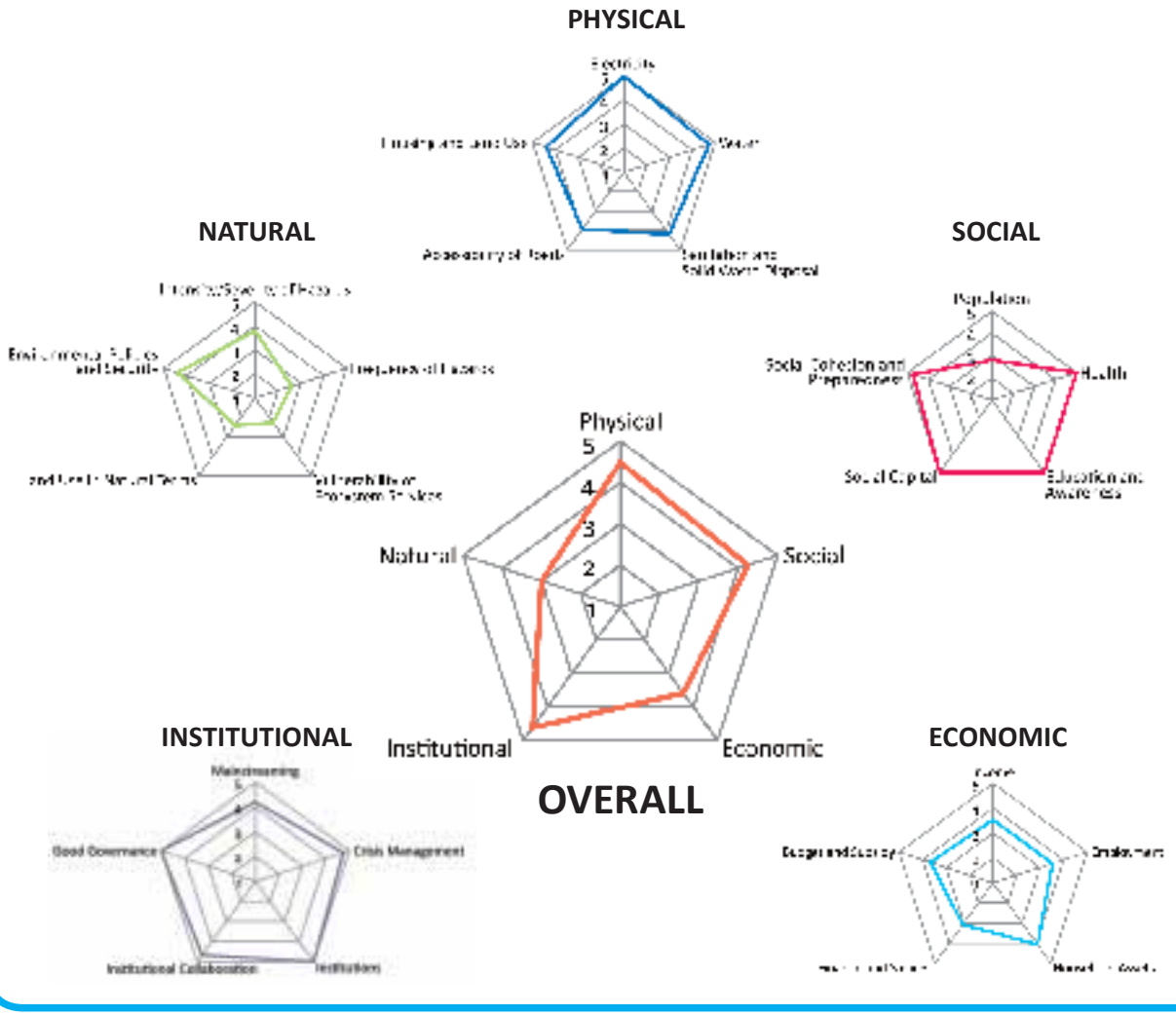
Almost 8,000 households in Las Piñas were affected by Typhoon Ondoy. The city should help households prepare for disasters in terms of logistics, materials, and management. A change in the people's mindset about voluntary evacuation is necessary. Effective disaster preparedness requires community participation. The involvement of residents in the design and implementation of activities helps to ensure they are properly customized to the actual vulnerabilities and to the needs of affected people. This is called informed engagement.

http://www.flickr.com/photos/asiacamera/3243153129/

City Profile and Overall CDRI

Makati is the financial capital of the Philippines. It has the highest GDP per capita among all the cities of the Philippines. The night-time population in 2008 was projected at 550,392 while the day-time population was estimated to reach 3.7 million because of the constant influx of workers, businessmen, tourists, and other transient travellers to the city. The city has a very compact urban environment with very limited area for expansion. Thus, most of the developments are vertical. Makati has the highest concentration of global companies, high-end commercial centers and luxurious hotels. Overall, Makati has high physical, social, and institutional resilience and moderate economic and natural resilience. With a CDRI of 3.988, Makati is the third most resilient city in Metro Manila.

Analysis Result



Physical

Makati has a very high score in Electricity but low score in Accessibility of roads, which is important because of the high day-time population (potential stranded commuters). Around 400,000 vehicles ply the city everyday. Traffic congestion along Makati Avenue, Ayala, and Buendia during rush hours needs to be constantly addressed as these are the main arteries into the commercial business district. The percentage of roads that remain accessible during catastrophic flooding (i.e. once every 50 years) is low. Being a very busy city, it is expected to produce a large volume of garbage daily. A large portion of the garbage generated is recycled formally through the municipal solid waste management and informally through the activities of scavengers and waste pickers in the dump site. Makati's solid waste diversion and reduction program has been named one of the Outstanding Local Governance Programs in the 2009 Galing Pook Awards. Since the program started, Makati was able to attain a significant waste reduction. The city's daily waste generation is now down from 3,175 cubic meters to 2,400 cubic meters.

Social

Among the cities of Metro Manila, Makati has the fifth highest social resilience. It has a very high score in 3 out of 5 parameters: Health, Education and awareness, and Social capital. It has a low score in Population, like all the other cities of Metro Manila. The maximum population density per square kilometer during day-time is extremely high. Its population is a mix of the most affluent living in exclusive villages, a growing middle class, and quite a number of low-income families.

Economic

Among the cities of Metro Manila, Makati has the fourth highest economic resilience. Although Makati is the financial capital of the Philippines, it scored low in Employment and in Finance and savings. In Makati there is a disparate gap between the western part of the city, which contains the Central Business District, and the eastern portion, which is largely poor and where most of the city's slums are located. There is a high unemployment rate of its own residents in the formal sector. And just a little above half the households have the habit of saving money. Less than 20% of the city's household properties are under any insurance scheme. Disaster risk financing instruments are not accessible.

Institutional

The city has a very high score in Effectiveness of city's institutions to respond to a disaster and in Good governance. Makati is said to be one of the most outstanding cities in the Philippines in urban disaster management. It was awarded the 2006 Gawad Kalasag for having the Best City Disaster Coordinating Council in the Philippines.

Natural

Makati has a low score in Frequency of natural hazards and in Vulnerability of ecosystem services. The frequency of floods and typhoons is high. The level of urbanization is also very high. The quality of urban biodiversity is very poor. The total urban green space area has become very small. Makati has 16 creeks/canals through which storm water is drained. Some of these waterways have poor water quality.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

The city is a model of urban risk reduction and has been featured in different local and international publications. Makati is fortunate to have the financial resources to fund its DRR and CCA activities. Other local government units in the Philippines and in other countries can learn from Makati's example.

2. Improving risk information and early warning

Its very high day-time population causes the city to have low vulnerability. Due to the frequency of floods and typhoons that hit the city, the city must be able to inform its residents and transients of road conditions (which ones are flooded and impassable, what are alternative routes, etc.). It helps that several TV and radio stations are giving continuous traffic advisories whenever there are typhoons and torrential rains.

3. Building a culture of safety and resilience

As a model city, Makati should regularly collate its best practices in urban risk reduction and disseminate these to other local government units throughout the country. These should include the various activities done by the city in observance of the National Disaster Consciousness Month every July. The city should keep up its very high literacy rate and community participation as they contribute significantly to building a culture of safety and resilience.

4. Reducing the risks in key sectors

Over-crowded housing and squatting, especially for the poor residents of the city, remain a serious problem that needs to be addressed for long-term results. Due to its very high day-time population density, Makati should be able to have good traffic management to prevent a huge number of stranded commuters. As prime properties are concentrated in the city, establishments must be encouraged to get insurance. Residents and non-residents alike must be made aware of hazard-prone areas and evacuation centers. The city should also extend, strengthen, and broaden community-based savings accumulation and income-generating activities

5. Strengthening preparedness for response

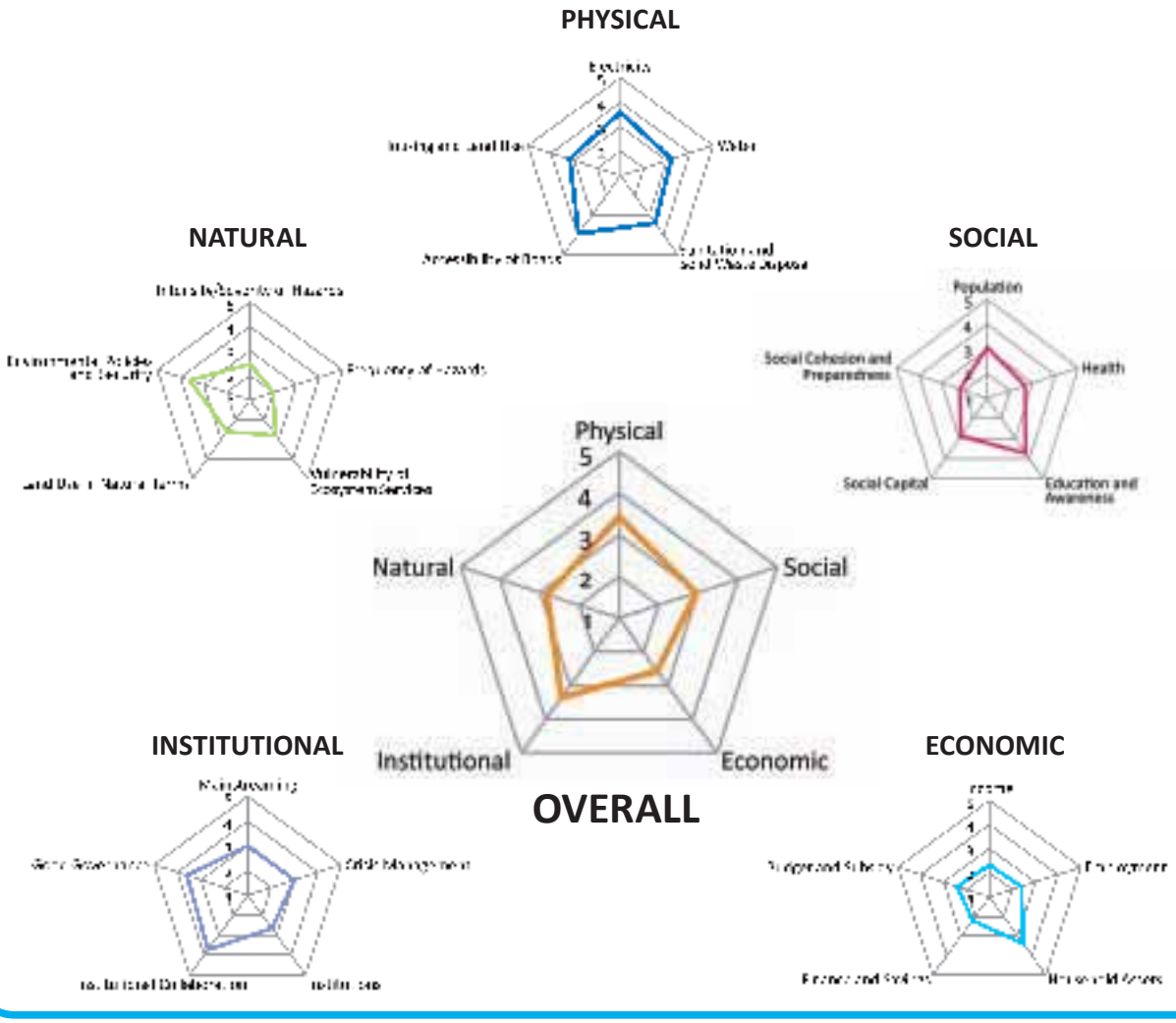
The effectiveness of the city's institutions to respond to a disaster is high, as expected of the country's premier commercial business district. Continuous training of emergency workers should be done to prepare them well as the large transient population can add overwhelmingly to their responsibilities. Makati is endowed with a lot of resources. Because of this, a wide range of opportunities are open to the City to enable it to spur further economic development and improve the total well being of its residents.

MALABON CITY

City Profile and Overall CDRI

Malabon has the second lowest GDP per capita in Metro Manila, after Pateros. The city is tagged as the Local Venice, due to year-long floods and gradual sinking. Because the City is dissected by a river and a great part is below sea level, some barangays are often flooded during high tides and rainy seasons. The clearing of structures, dredging the river, and cleaning all the esteros and waterways that drain into the river may be done to reduce the frequency and degree of flooding. Overall, Malabon has moderate institutional and physical resilience and low social, economic, and natural resilience. With a CDRI of 3.024, Malabon is the least disaster resilient city in Metro Manila.

Analysis Result



Physical

Among the cities of Metro Manila, Malabon has the lowest physical resilience. It has a high score in Electricity but low score in Accessibility of roads. The city scored low in the percentage of city's land used as transportation network and percentage of city accessible by paved roads (asphalt or concrete roads).

Social

Malabon has a low score in Population. The population under 14 years old is high. The city's population density in 2007 is the fifth highest in Metro Manila at 23,076 per square kilometer. Among the local government units (LGUs) of the National Capital Region, Malabon has the lowest social resilience. Around one-third of the population of Malabon in 2002 lived in depressed settlements.

Economic

Malabon has the second lowest economic resilience in Metro Manila. The percentage of youth unemployed in the formal sector is high due to lack of education, special skills, or experience. These include the out of school youth and fresh graduates who have difficulty finding a job. The percentage of the city's household properties under any sort of insurance scheme is low. Without adequate protection, Malabon's urban poor will be exposed to a high degree of risk from floods and typhoons.

Institutional

In Malabon, as in many parts of Metro Manila, awareness raising needs to be intensified as many urban residents are not yet aware of the impacts of climate change. There is a need in the local government for increased political commitment to support and encourage DRR and CCA. City officials need to improve its coordination and collaboration with national government agencies, the academe, the private sector, and local government units. The city should strengthen the capacities and competencies of its emergency personnel through training and capacity building programs.

Natural

Among the cities of Metro Manila, Malabon has the lowest natural resilience. The frequency of floods and typhoons is high. The urban water quality in rivers is low. The intensity of land-use is high. The total urban green space is minimal. There are settlements located on hazard-prone areas, further driving up the climate disaster vulnerability of Malabon. Flooding is worsened by local urban processes and activities that cause river flow obstruction and pollution. Many households resided on or near the riverbanks. Whether in its normal or flooded state, the river was a hazard to these communities. During continuous heavy downpours or typhoons, the river level rise so much that informal settlers have to vacate their homes and stay in evacuation centers until the floodwaters recede.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

Strong commitment by the city government is needed to save lives and livelihoods threatened by natural disasters. And community participation is required so that local needs are met. The city should work on institutional collaboration and mainstreaming disaster risk reduction. Efforts should be monitored so that there will be a basis on how future performance can be improved.

2. Improving risk information and early warning

A flood early warning system for local communities will not only save lives but will also substantially reduce damage costs. The city should initiate city-wide risk assessments to provide a more complete and regularly updated picture of the city's risk and allow decision-makers to better set priorities for action. The city may invite external experts and practitioners involved in hazard and vulnerability assessments to help in documenting and mapping capacities and vulnerabilities. Risks assessments identify both hazards to which residents are exposed and the city vulnerabilities. Risk assessments should consider the effects of urbanization (demographic changes), land-use change, environmental degradation, and climate change.

3. Building a culture of safety and resilience

Community-based training on emergency response should be provided to residents, especially to those living in flood-prone areas. Malabon should work on increased public awareness and education to enhance disaster risk reduction. The city government should be proactive in engaging the citizens. It is advisable to actively participate in the month-long celebration of National Disaster Consciousness Month.

4. Reducing the risks in key sectors

Informal settlements along the riverbanks added to the pressures of pollution and flooding. Malabon's local authority and people should focus on how the physical restoration of the riverbanks and solid waste clean-up can contribute to flood disaster mitigation and prevention of water-borned diseases.

5. Strengthening preparedness for response

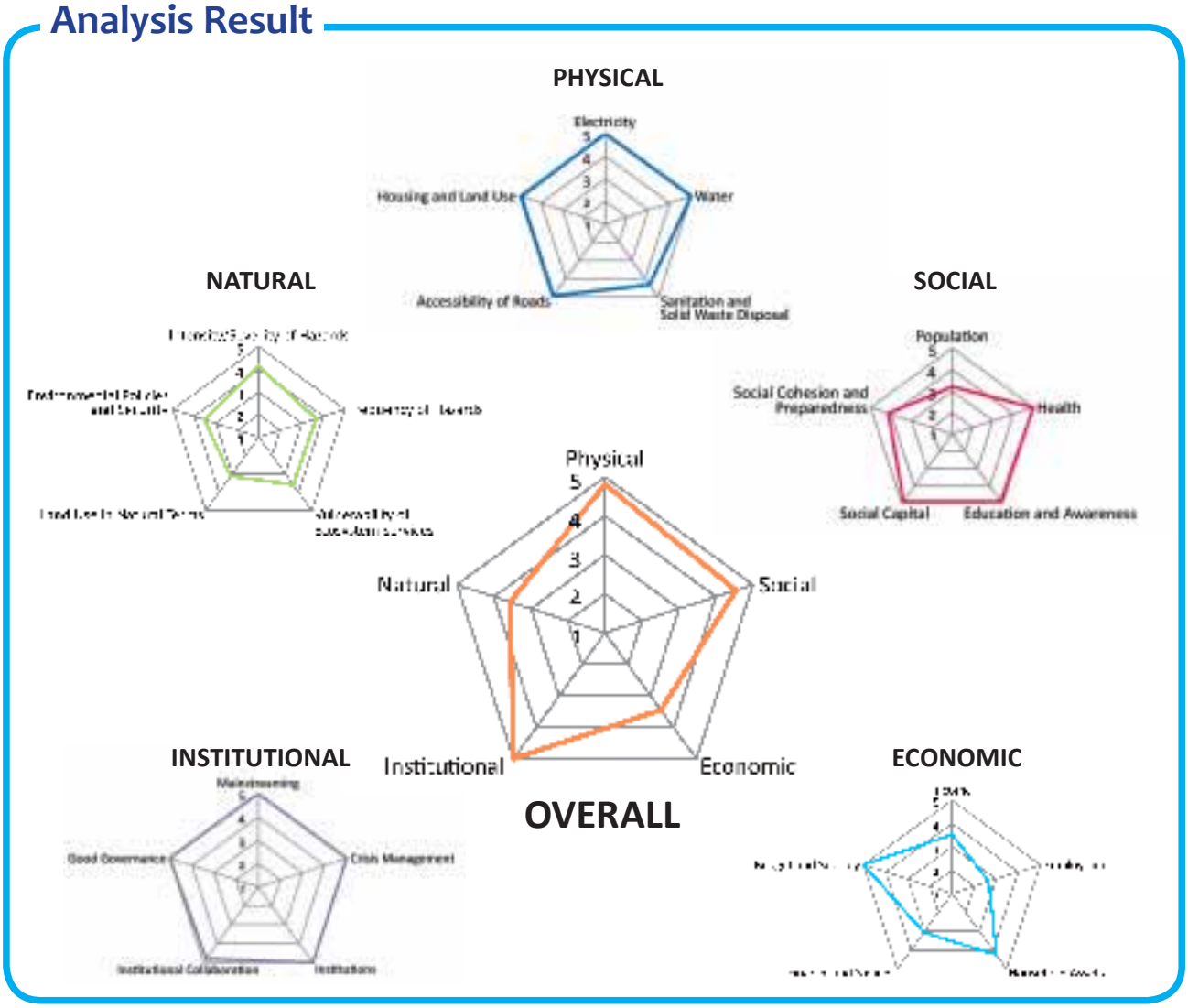
Even though the river had caused destructive flooding events over the years, the riverbanks are still considered as potential settlement sites by those who could not afford to buy land or property in safer parts of the city. Malabon's poor will have a difficult time dealing with the increased frequency and intensity of typhoons and floods. Participatory approaches can capitalize on indigenous coping mechanisms, which are sensitive to gender, cultural, and other context-specific issues that can empower residents to take locally based actions. Malabon should increase the number of its emergency workers and also increase and improve training programs.

MANDALUYONG CITY

City Profile and Overall CDRI

Mandaluyong lies at the heart of Metro Manila. Mandaluyong's remarkable rate of development since the early 1980's established the city as one of the most progressive economic centers in the country. Now it is the third most densely populated city in Metro Manila and has the second highest GDP per capita. No less than the World Bank has rated Mandaluyong as the Most Business-Friendly City in the Philippines in terms of Registering Property in its recent Doing Business Report. In addition, the Asian Institute of Management Policy Center conferred Mandaluyong as "Best in Quality of Life" in its latest city competitiveness study. At present, Mandaluyong is dubbed as the "Tiger City of the Philippines." The headquarters of the Asian Development Bank is located in Mandaluyong. Overall, Mandaluyong has high physical, social, and institutional resilience and moderate economic and natural resilience. With a CDRI of 4.27 out of 5, Mandaluyong ranks as the most resilient city in Metro Manila.

Analysis Result



Physical

Among the cities of Metro Manila, Mandaluyong has the highest score in the physical dimension (4.81 out of 5). It has a perfect score in Electricity and in Water. Its weakest point is Sanitation and solid waste disposal. Mandaluyong generates about 1,200 cubic meters of solid waste per day, a combination of domestic, commercial/ industrial, and institutional/ hospital wastes. Each resident generates approximately 0.71 kg of solid waste per day, which is beyond the standard range of 0.23 to 0.60 kg or an average of 0.40 kg per capita per day as indicated in several studies in Metro Manila. One contributing factor to such increase is the intensive use of disposable materials in lieu of reusable day to day items such as food containers, kitchen utensils, personal paraphernalia and the like, as can easily be observed from filled garbage bins and street litter.

Social

Despite having the third highest population density in Metro Manila at 27,138 per square kilometer, Mandaluyong has the second highest score in the social dimension. It has a very high score in Health, Education and awareness, and Social capital. The peace and order situation of the city, the status of its residents' well-being, and its environmental preservation initiatives are among the best in the region.

Economic

Typical of cities in metropolitan areas, Mandaluyong has its own share of commercial strips and a central business district. Mandaluyong is host to establishments such as the SM Megamall, one of the largest malls in the world; Edsa Shangri-La Hotel, a five-star hotel; high-end shopping centers like The Podium, and one of Southeast Asia's biggest food and beverage companies, the San Miguel Corporation. With its revenues, Mandaluyong is one of the few cities with more than 7.5% of its annual budget targeted on DRR efforts. Consequently, it has a high score in Budget and subsidy. In addition, in response to the strengthening of global advocacy towards full protection and recognition of the rights of workers in the informal sector, the city government created the City Informal Sector Office.

Institutional

Among the cities of Metro Manila, Mandaluyong has the highest score in the institutional dimension (almost perfect score of 4.99 out of 5). It has a perfect score in 4 out of 5 parameters: Mainstreaming of disaster risk reduction and climate change adaptation, Effectiveness of city's crisis management framework, Effectiveness of city's institutions to respond to a disaster, and Good governance.

Natural

Among the cities of Metro Manila, Mandaluyong has the second highest natural resilience. The city has a low score in Land-use in natural terms and in Vulnerability of ecosystem services. The frequency of floods is high. The quality of urban water quality in rivers, creeks, and canals is low. And there are settlements located in flood-prone areas, increasing the city's vulnerability exposure. Typhoons during the wet season greatly affect the city and the rest of Metro Manila. Damage to property and risk of lives are among the major effects of typhoon. Secondary to these are the flash floods that severely affect the lowland areas. Heavy rains, even of short duration, results to flooding in some areas of Mandaluyong, especially in barangays lining the coasts of the Pasig and San Juan Rivers.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

The city has very high score in institutional resilience. It must continue being innovative to keep its impressive performance. In 2009, the mayor of Mandaluyong, who was the president of the Union of Local Authorities of the Philippines (ULAP) and the League of Cities of the Philippines (LCP), was one of those pushing for the swift passage of the Disaster Risk Reduction and Management (DRMM) Bill. The mayor said he was particularly in favor of the institutionalization of DRRM at the local government level and the increased participation of non-government organizations in DRRM. Instead of putting money in the calamity funds, which are released when a disaster strikes, the DRRM bill will ensure that government resources will be invested in building the resiliency of communities in preparing for and coping with disasters.

2. Improving risk information and early warning

As some parts of the city get inundated by Pasig River during heavy rains, constant monitoring of the river height during the rainy season is necessary to provide early warning to flood-prone residents. Also, statistical information on disaster risks, impacts, and losses must be compiled and disseminated. Sufficient funding will facilitate these tasks.

3. Building a culture of safety and resilience

Having the highest CDRI in Metro Manila, Mandaluyong can share good practices with the other cities, as a guide to the other cities to what works and what does not work. Learning from these experiences can help city executives avoid the pitfalls of poor or lack of planning. This move will also strengthen networks and promote dialogue and cooperation among disaster experts, planners, and stakeholders from different cities.

4. Reducing the risks in key sectors

In a disaster, progressive cities like Mandaluyong cannot afford to lose hospitals, schools, communication systems, transportation routes, evacuation centers and government services buildings. The impact of a disaster can be reduced by ensuring prompt resumption of essentials services, such as power, sanitation, water, and access to basic government services.

5. Strengthening preparedness for response

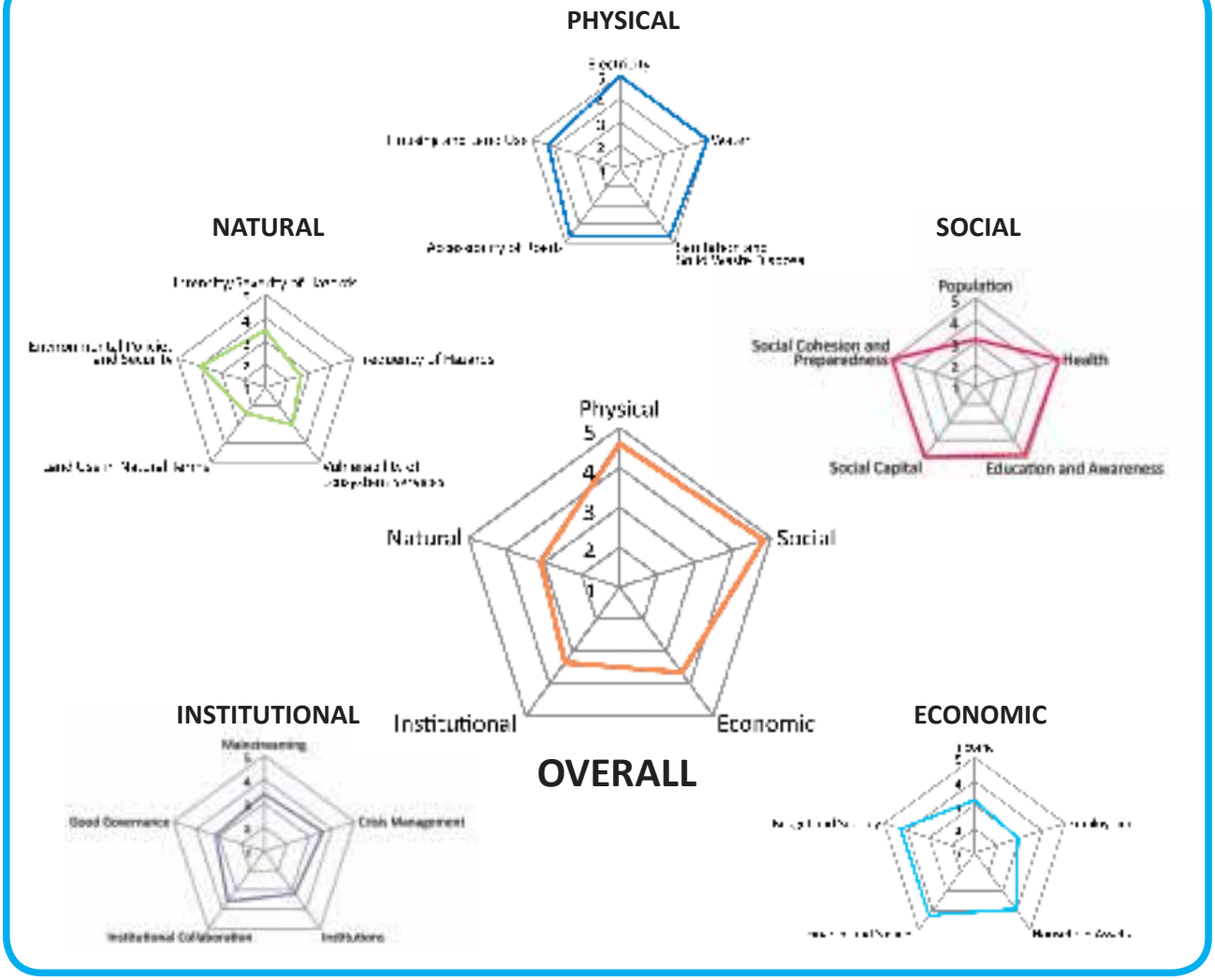
The city should help households prepare for disasters in terms of logistics, materials, and management. Voluntary evacuation of residents living near rivers and creeks should be made one of the indicators of preparedness. Regular preparedness exercises, including evacuation drills, are key to ensuring rapid and effective disaster response.

http://www.travel247.ie/images/cities/MNL_Manila_Cathedral_b.jpg

City Profile and Overall CDRI

Manila is the capital city of the Philippines. Malacañang Palace, the official residence of the President of the Philippines, is located in Manila. With a population density of 43,079 per square kilometer, Manila has the second highest population density among all cities proper worldwide (Dhaka city proper in Bangladesh is No. 1). Manila's population in 2007 was 1.7 million. Manila is divided into six congressional districts, which are further divided into 100 zones and 897 barangays. It is located on the eastern shores of Manila Bay. With its excellent protected harbor, Manila serves as the nation's chief seaport. Being one of the major tourist destinations in the country, the city attracts over 1 million visitors from all over the world annually. Overall, Manila has high physical and social resilience and moderate economic, institutional, and natural resilience.

Analysis Result



Physical

Among the cities of Metro Manila, Manila has the fifth highest physical resilience. It has a very high score in Electricity and Water. However, pollution brought about by inadequate solid waste management is a serious environmental problem. Garbage generated by domestic, commercial, and industrial activities enters Manila Bay directly or via the river and drainage systems. Clogged drainage results in flooding during the rainy season. Solid wastes impair natural ecosystems, degrade the beauty of the city, and pose health risks. Clean-up is expensive. There is increased need for government action, particularly for efficient collection and appropriate disposal of municipal garbage and ship waste.

Social

Among the cities of Metro Manila, Manila has the highest social resilience (4.81 out of 5), notwithstanding its low score in Population. Manila has the highest population density among the cities in Metro Manila and the second largest population. In addition, a million more transients are added during daytime as students and workers come to the city. Thankfully the city now has the slowest population growth among the cities of Metro Manila, at 0.68% per year. Manila has a high score in Education and awareness, Social capital, and Social cohesion and disaster preparedness.

Economic

Many households in Manila depend on only one source of income. Only a small percentage of women are employed in the formal sector. Most of the household assets are not insured. Subsidies for residents to rebuild houses after a disaster are not available. In 2002, around 30% of the total households in Manila are in depressed communities.

Institutional

Among the cities of Metro Manila, Manila has the lowest score in the institutional dimension (3.34 out of 5). Incorporation of disaster risk reduction and climate change adaptation measures in housing plans and policies is limited. Disaster drills led by the city government are not done often. The effectiveness of early warning systems in the city is limited. Institutional collaboration with neighbor cities, national government agencies, NGOs, and the academe still has big room for improvement.

Natural

Manila experiences the same climatic conditions prevailing over the whole of Metro Manila. Manila is greatly affected by the high frequency of floods and typhoons that hit the city. It does not help that the level of urbanization in the city is extremely high. The quality of natural ecosystems in the city is poor. For example, mangroves, which are among the most productive ecosystems, have almost vanished from Manila Bay. At the turn of the 20th century, there were about 54,000 hectares of mangrove around the bay. By 1990, only 2,000 hectares were recorded, and in 1995, only about 794 hectares remained. Mangroves provide nursery function to various species of fish and they also serve as a pollutant sinks by filtering certain types of waste, as well as provide shoreline defence against floods and erosion.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

The City Disaster Council should review annual budget for disaster risk management if sufficient to protect the people in the country's capital city. Periodic reviews on the performance of the council will help in measuring progress towards achieving objectives and priorities, in identifying possible gaps and next steps to take. It helps if there is a set of quantifiable indicators against which performance can be assessed. Short-sighted policies and practices might negatively affect the disaster resilience of Manila's 897 barangays in the future.

2. Improving risk information and early warning

Different hazard maps for Metro Manila have been available for many years. The city should increase the dissemination and access to these maps. Technical information in hazards maps should be "laymanized." The city should make sure that residents in flood-prone areas are alerted of coming typhoons. Effectiveness of existing early warning systems should be evaluated.

3. Building a culture of safety and resilience

The city should continue to organize public awareness campaigns and disaster drills. There are various activities that can be used in awareness campaigns: motorcade; hanging of streamers; photo exhibit; orientation on disaster management policies and guidelines; tree planting; training on stress debriefing; seminar workshop on damage assessment and needs analysis; awarding of best first-aid teams; orientation on typhoon and flood awareness; training on family and community disaster preparedness; Mass for disaster victims; Manila Bay clean-up; etc.

4. Reducing the risks in key sectors

The population problem is a serious concern that needs to be addressed. The city, together with other stakeholders, should try to decongest slums and relocate urban poor living in hazard-prone areas. The natural environment, especially the Manila Bay area, is facing various threats from different factors: overpopulation, pollution, poorly planned coastal development, and habitat degradation. The effects on human wellbeing have resulted in increasing health and social services expenditures. Manila must manage the population and environmental issues in parallel for a holistic solution to the problems the city is facing. Because the city is relatively low in elevation, increased coastal protection is important. Coastal defences to buffer sea-level rise and storm surges should be in place. This should include restoration and protection of coastal ecosystems.

5. Strengthening preparedness for response

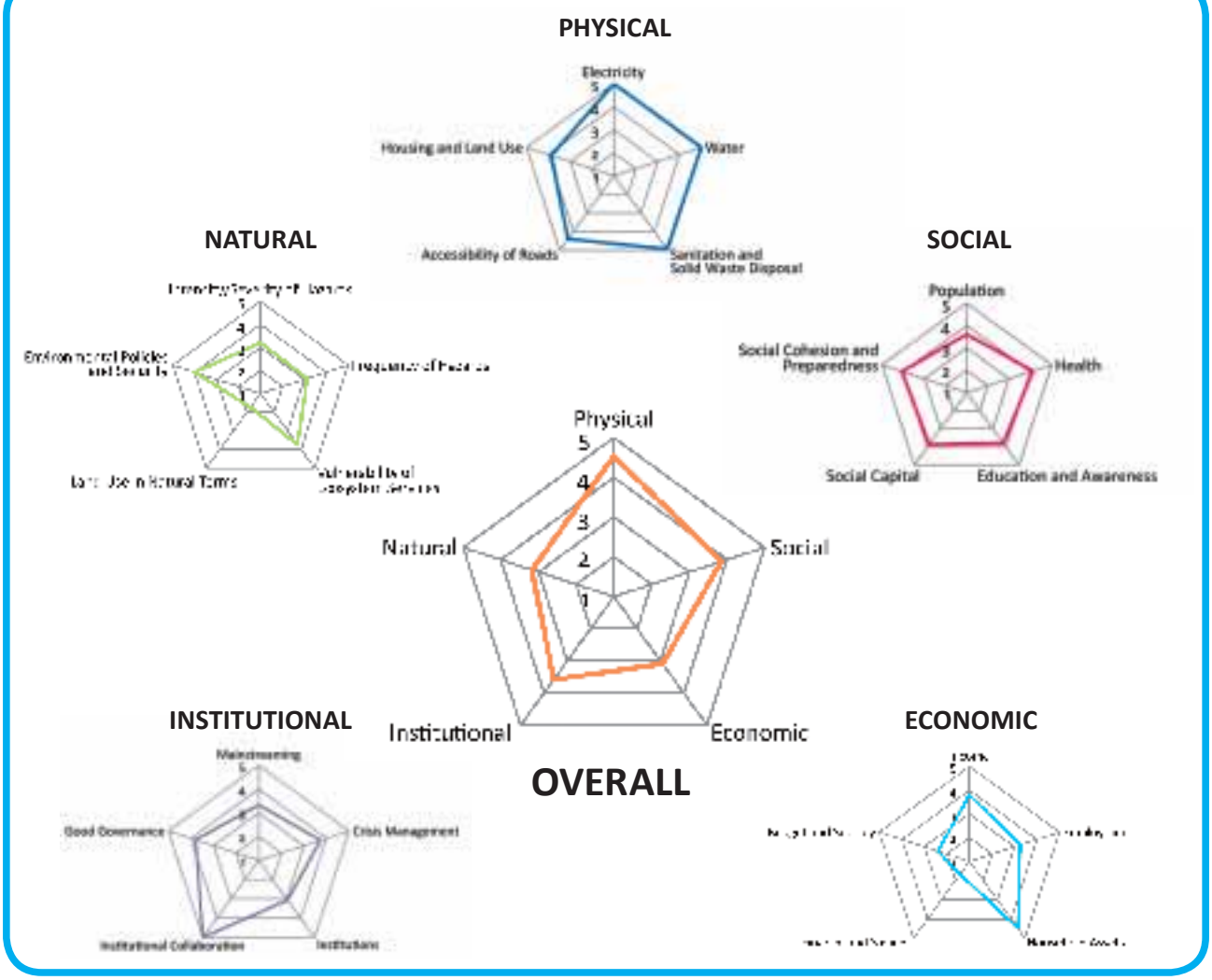
The people of Manila should work hand in hand with the city government to protect themselves from coming extreme weather events that will not only destroy valuable property but put people's lives at great risk. There should be continuous dialogues and regular preparedness exercise. Natural hazards like typhoons cannot be prevented, but it is possible to reduce their impacts by reducing the vulnerability of people and their livelihoods.

http://letters2mindanao.files.wordpress.com/2009/06/marikina-values.jpg

City Profile and Overall CDRI

Marikina is a multi-awarded city, often cited for its vibrant economy, highly-skilled work force, involved and enlightened business community, environment conscious, disciplined people, and a responsive local government that puts a premium on governance, sustainable urban development, and public service. Marikina is considered as one of the healthiest and most livable cities in the Asia-Pacific region. Marikina is the second local government, after Las Piñas, to be awarded as Hall of Famer in The Cleanest and The Greenest City category awarded by the Philippine government. Marikina is the second local government in the Philippines, again after Las Piñas, honored with the prestigious Global 500 Roll Of Honour of the United Nations Environmental Programme (UNEP). Overall, Marikina has high physical resilience and moderate social, economic, institutional, and natural resilience.

Analysis Result



Physical

Marikina has a perfect score in Electricity and Water. Garbage collection efficiency rate is 99%, the highest in Metro Manila. However its score in Housing and Land Use is low. There are many buildings constructed not following a building code for hydro-meteorological disasters like floods. The percentage of roads that remain accessible during normal flooding (e.g., after a heavy rain) in affected areas is less than 40%.

Social

Marikina has a low score in Population and in Social capital. The maximum urban population density per square kilometer is 12,500. Due to the frequency of flooding that hit the city, most of the households are already overwhelmed and are not prepared for a disaster in terms of logistics, materials, and management.

Economic

Unemployment rate in 2007 is at 12.5%. The city is low in Finance and savings and in Budget and subsidy. Less than 20% of the households have a habit of saving. Also, less than a fifth of the households' properties are under any sort of insurance scheme. There is no access to disaster risk financing instruments.

Institutional

Marikina has a perfect score in Institutional collaboration with other organizations and stakeholders. In 2008, there were 62 NGOs based in Marikina. However, it has a low score in Effectiveness of city's institutions to respond to a disaster. The city's formal institutions as well as the informal organizations like NGOs are only slightly effective during and after a disaster. The early warning system operated by the city government needs improvement, like re-education of the target residents so that they will be more responsive to the issued alarms.

Natural

Marikina has a low score in Land Use in natural terms. Most of the city area is vulnerable to climate-related hazards. Being along the Marikina River, the city is affected by the high frequency of typhoons. The intensity of land-use is high. And settlements are located on hazardous ground (e.g. steep slope, flood prone area). Compared to other storm-hit areas in the Philippines, Marikina was the most devastated by Typhoon Ondoy. Almost the entire city was submerged in water. During the typhoon, Marikina River broke off from its banks and transformed streets into rivers. The number of deaths in Marikina was the highest among Metro Manila cities.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

Being perennially affected by floods, the city should review the sufficiency of its budget allocated to disaster management. More work on improved mainstreaming of DRR and CCA in city's land use plans, school curriculum, transport policies, environmental programs, etc. should be done. Based on the Typhoon Ondoy experience, the city should conduct baseline assessments on the status of disaster risk reduction. Local DRR programs should be updated accordingly. As part of its overall disaster management plan, the city government had created three groups: the Marikina Disaster Coordinating Council, the Barangay Disaster Coordinating Councils, and the School Disaster Management Committees. Each group must regularly conduct its own self-evaluation to facilitate continuous improvement.

2. Improving risk information and early warning

Studies by the National Institute of Geological Sciences pointed out that it took several hours before water from the watershed could research the city proper during Typhoon Ondoy. The city should spearhead in establishing an early warning system that can be used to gather information upstream of Marikina River so that residents in lower parts of the city can be alerted of coming floods and flash floods

3. Building a culture of safety and resilience

The city should try to increase the resident's awareness of the threats and impacts of disasters and enhance the participation of residents in community activities where they can get information of disaster risk reduction and climate change adaptation. Continuous disaster education can contribute to a change in risk perception and to a reduction in the vulnerability of residents to flooding. One way to do this might be to increase the readership of the city's 90-page "Disaster Management Handbook," which it used in its 2008 disaster preparedness campaign.

4. Reducing the risks in key sectors

The local government should make sure that buildings are constructed following building codes for hydro-meteorological disasters like floods. It needs to identify alternate roads that motorists can take when major roads are flooded and impassable. The city should encourage disaster-prone residents to get insurance for their properties.

5. Strengthening preparedness for response

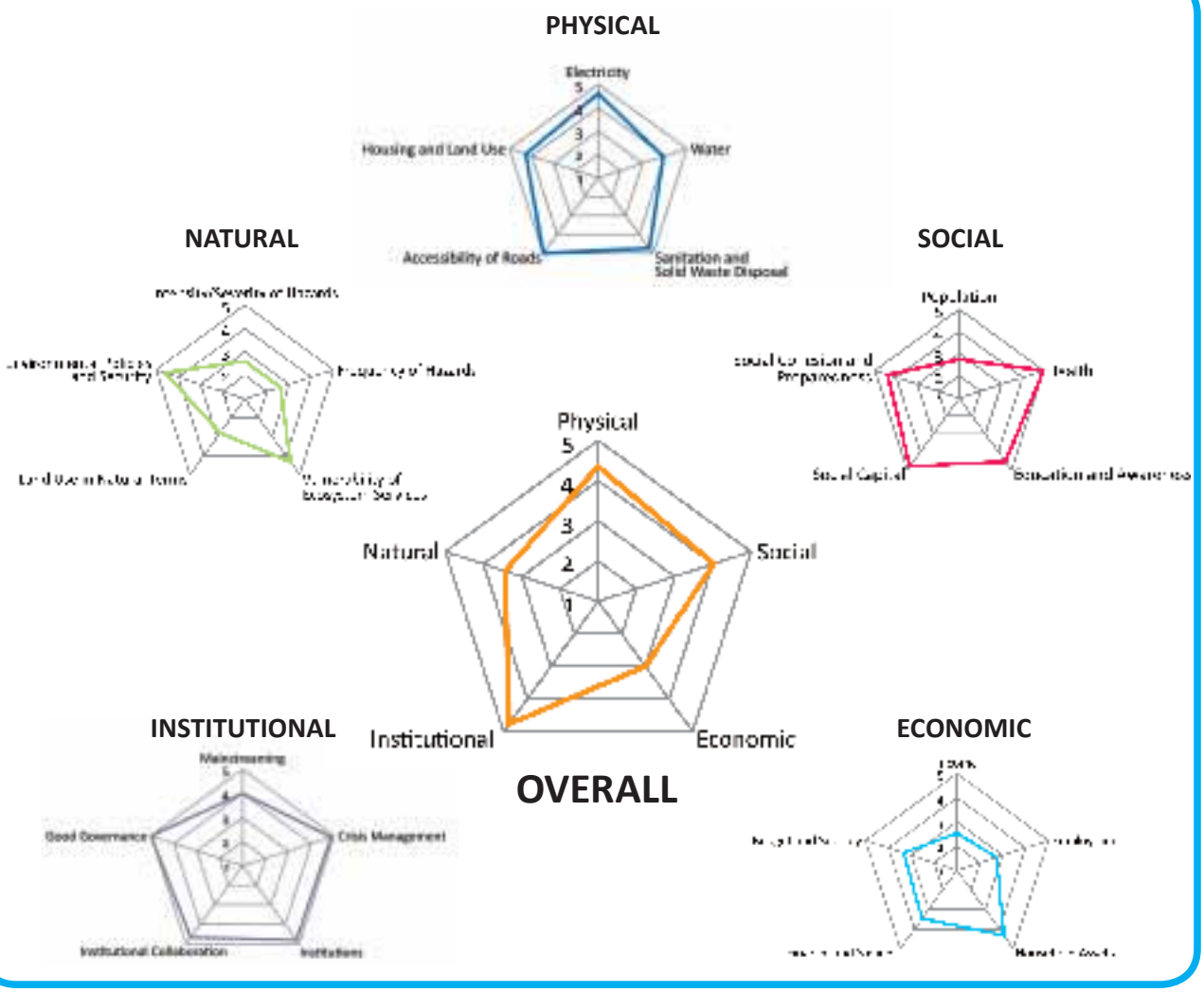
The city should review the effectiveness of city's formal organizations during and after a disaster. It should increase the number of trained emergency workers and compile lessons learned from previous disasters. Preparedness involves many types of activities like developing and regularly testing contingency plans, maintenance of emergency funds, continuous dialogue among planners, emergency personnel, policy-makers, NGOs, and community residents. The local government should continue stressing the value of empowering people to act reasonably and responsibly in the face of disasters.

MUNTINLUPA CITY

City Profile and Overall CDRI

Muntinlupa is the least densely populated city in Metro Manila. It is located on the southwestern coast of Laguna Lake, the largest inland body of water in the Philippines and second largest lake in Southeast Asia. Muntinlupa is home to some of the best commercial establishments in Metro Manila and is the location of Ayala Alabang Village, one of the country's biggest and most expensive residential communities, where many of the wealthy and famous live. In stark contrast, in 2002, 27.3% of the total population of Muntinlupa lived in depressed settlements. Overall, Muntinlupa has high physical, social, and institutional resilience and moderate economic and natural resilience. Among the cities of Metro Manila, Muntinlupa has the fifth highest CDRI.

Analysis Result



Physical

The city has perfect score in Accessibility of Roads but has a low score in Water. Like most cities in Metro Manila, Muntinlupa has faced health and water-related problems for years due to the scarcity of clean water and the increasing amounts of untreated wastewater that is released into the rivers that flow into Laguna Lake. Like Las Piñas and Parañaque, many residents of Muntinlupa obtain water by motorized deep well, contributing to the problem of land subsidence and urban salinity. The city should evaluate the environmental impacts and sustainability of deep wells and, at the same time, improve the capacity of alternative emergency safe water supply system (water purification system, stored water, etc.).

Social

Muntinlupa has a perfect score in Health but low score in Population. Muntinlupa is both the gateway to adjoining CALABARZON region and the entry point to Metro Manila. It continues to attract rural migrants, making the city's annual population growth at 2.48% the fifth fastest in Metro Manila. The percentage of the city's population that live in slum areas or informal settlements is high. In 2009, the mayor of Muntinlupa issued an executive order that provides for the city-owned Ospital ng Muntinlupa to extend low-cost or even free services to residents in need of medical attention. Through the order, San Pedro created a management committee to draw up plans, programs and strategies on how the hospital can be developed into a more responsive health-care provider that is self-sustaining, efficient, and effective in the delivery of health services.

Economic

The city has a low score in Income and in Employment. A large percentage of the city's population live below the poverty line and there is high unemployment in the formal sector. Unemployment is largely a problem of young unskilled and inexperienced labor force. Underemployment is prevalent in the adult population. There is a large volume of street vendors in the city, who are viewed as causes of traffic, both for vehicles and pedestrians, by being obstructions in the streets and sidewalks. There is a very wide gap between the urban poor living along railways and the residents of luxurious exclusive villages like Ayala Alabang.

Institutional

Among the cities of Metro Manila, Muntinlupa has the fourth highest institutional resilience. The city has a high score in Good governance, in the Effectiveness of the city's crisis management framework, and in the Effectiveness of the city's institutions in responding to disasters. But the city needs to improve its collaboration with neighboring cities for emergency management as well as in mainstreaming DRR and CCA in the city's land use, housing, school curriculum, transport, and environmental plans and policies.

Natural

Muntinlupa scored low in three parameters: Intensity/severity of natural hazards, Frequency of natural hazards, and Land-use in natural terms. There is high severity and frequency of floods and typhoons and many settlements are located in flood-prone areas. The urbanization of Muntinlupa worsens flooding. The spread of paved surfaces guarantee that more storm-water will concentrate in the drainage systems which are easily overwhelmed. Since the development of several subdivisions and villages with poor drainage systems and connections, the city has been experiencing flooding which subsides ranging from a few hours to three days. In the past, Muntinlupa experienced moderate to severe flooding when the lake water level almost reached the national road and affected the lower portions of all the barangays adjacent to the shoreline.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

More than ten thousand families in Muntinlupa were affected by Typhoon Ondoy. Disaster risk reduction should be an essential part of the city's investment in sustainable development. Relevant measurable indicators are useful in monitoring progress on disaster risk reduction. The city should enhance collaboration with other organizations and stakeholders like neighboring cities, NGOs, the academe, etc. It must also improve the mainstreaming of DRR and CCA in the city's programs and projects

2. Improving risk information and early warning

Muntinlupa's urban development has led to the existence of numerous densely populated areas at risk of disaster, particularly near the lake, rivers, and creeks. There is a need to identify all such sites and analyze the risks. Hazard maps should be prepared and made public, for example on the city's official website. The city must work to keep people informed about hazard maps because many people do not pay attention to the maps during non-disaster times. The city should develop early warning systems for residents in hazard areas.

3. Building a culture of safety and resilience

The city should try to increase the resident's awareness of the threats and impacts of disasters. Regular consultation with key actors, including technical experts, national agencies, and community leaders, will be helpful in the process of disaster education. Key activities to increase awareness of disaster prevention include providing relevant and updated information on disaster risks and means of self-protection, especially for residents in high-risk areas. The National Disaster Consciousness Month should be included in the calendar of activities of the city.

4. Reducing the risks in key sectors

Vulnerability to typhoons and floods is increased in many ways, like living in hazard-prone areas, destroying mangroves and wetlands thereby harming the capacity of the environment to withstand hazards, building houses and facilities not sturdy enough to withstand strong wind and rain; and not having social and financial safety mechanisms. Therefore protecting and restoring natural ecosystems along the Laguna de Bay shoreline is a good adaptation measure, which may prove to be highly cost-effective. Relocating communities in high-risk areas to safer locations is important.

5. Strengthening preparedness for response

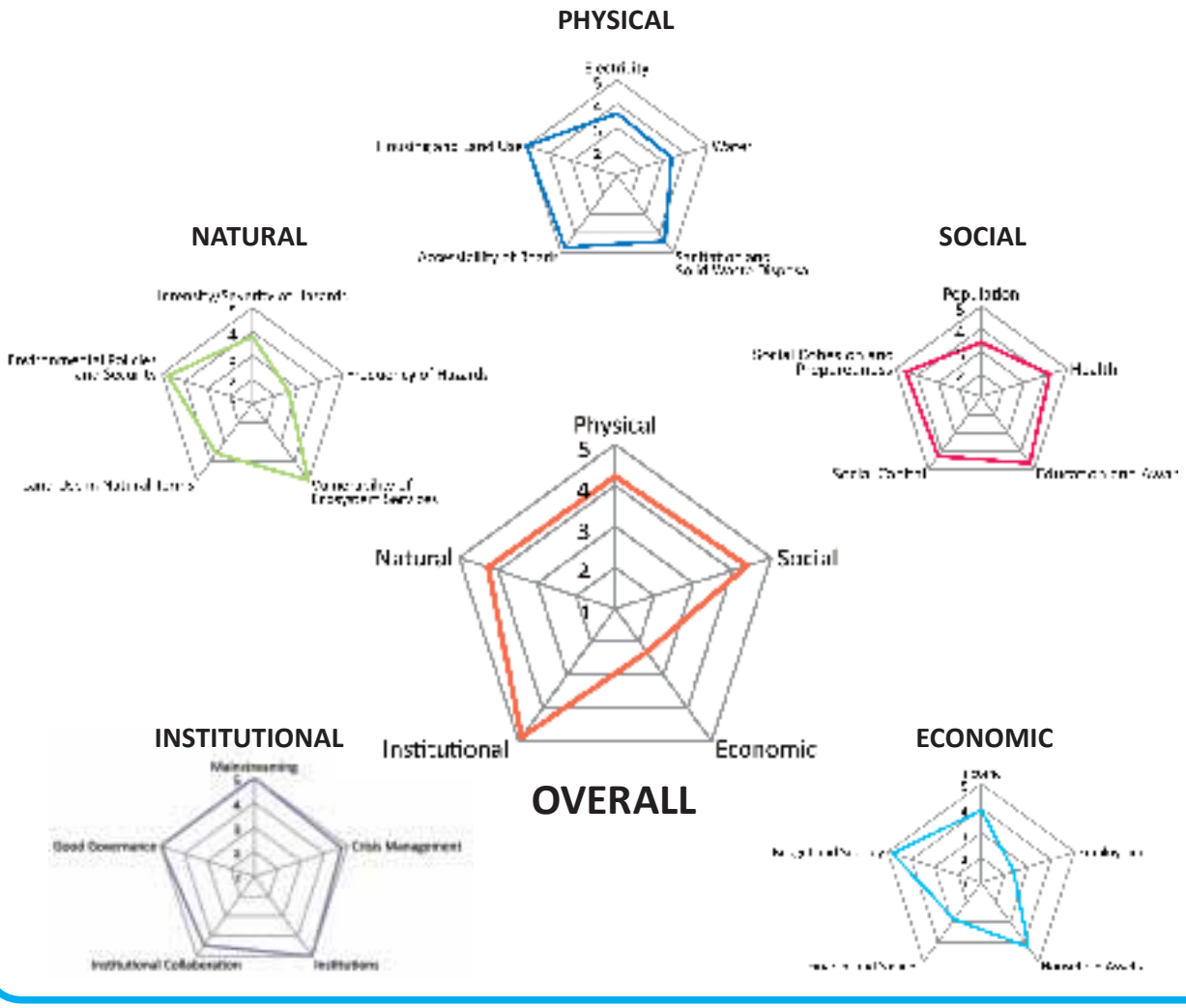
Effective disaster preparedness relies on the efforts of many different stakeholders, including local government agencies and civil society (volunteers, private sector, media, academe, etc.). The city should enhance preparedness of households for a disaster and inculcate to them the benefits of voluntary evacuation. This can be facilitated by assisting the urban poor increase their household income through gainful employment.

http://philippines.bayaw.com/pictures/navotas-4.jpg

City Profile and Overall CDRI

Navotas is the third smallest city in Metro Manila in terms of both land area and population. It is a narrow strip of land with an aggregated shoreline of approximately 4.5 kilometers. It has the second slowest population growth among the cities of Metro Manila (tie with San Juan) and the third lowest GDP per capita. It was converted from municipality to city only in 2007. Dubbed as the "Fishing Capital of the Philippines", Navotas is considered to be a very important fishing community with 70% of its population deriving their livelihood directly or indirectly from fishing and its related industries like fish trading and fish net mending. More than 45% of the land area of Navotas is classified as fish ponds. Navotas is prone to flood especially during the rainy season and during high tide. Overall, Navotas has high physical, social, institutional, and natural resilience and low economic resilience. Among the cities of Metro Manila, Navotas has the second highest CDRI, after Mandaluyong.

Analysis Result



Physical

Navotas has a high score in Housing and Land-use but low score in Electricity and Water (the lowest among the 17 cities). Navotas needs to improve the capacity of alternative emergency electric supply system (may include on-site backup generation, uninterruptible power supplies, etc.) to keep emergency services functioning (e.g., hospital, evacuation centers, etc.) and the capacity of alternative emergency safe water supply system (water purification system, stored water, etc.).

Social

Among the cities of Metro Manila, Navotas has the third highest social resilience. It scored high in all the indicators except the Population parameter. The proximity of Navotas to the nearby Tagalog provinces and the existence of the biggest fishing port in the country have attracted migrants into settling in the city. The percentage of the city's population under 14 years old is high. The population density is high at 22,780 per square kilometer.

Economic

Among the cities of Metro Manila, Navotas has the lowest economic resilience. It has a low score in Employment and in Finance and savings. Both the percentage of youth unemployed in the formal sector and the percentage of labor employed in the informal sector are high. Unemployment rate in 2003 was 23%. Majority of the residents don't have the habit of saving money. Unfortunately, the poor will be hardest hit when disasters strike. There are vulnerable coastal slum communities in Navotas. The economic losses due to the deterioration of Manila Bay and subsequent decline in economically important resources will be felt most by the fisherfolks, particularly those who depend on subsistence fishing.

Institutional

Among the cities of Metro Manila, Navotas has the second highest score in the institutional dimension, after Mandaluyong. It has a perfect score in 3 out of 5 parameters: Mainstreaming of disaster risk reduction and climate change adaptation, Effectiveness of city's institutions to respond to a disaster, and Good governance. It would be helpful if the city can showcase its DRR and CCA plans and programs in its official website so other cities can learn from the good practices in Navotas.

Natural

Among the cities of Metro Manila, Navotas has the highest score in the natural dimension. It has a perfect score in Vulnerability of ecosystem services (the only city with perfect score in this variable). It has a low score in Frequency of natural hazards. Navotas often experiences floods and typhoons. Increases in the frequency and intensity of climate-related hazards will make coastal communities more vulnerable and further challenging subsistence-based livelihoods.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

Disaster risk reduction spans all sectors of society and requires attention by multiple stakeholders. Navotas should improve institutional collaboration with other organizations and stakeholders and incorporate uncertainties due to climate change in the disaster management plans. Strong local government commitment is required to save lives and livelihoods threatened by natural hazards like typhoons, floods, sea-level rise, and storm surge. Navotas must allocate sufficient resources to support and maintain DRR and CCA plans and programs.

2. Improving risk information and early warning

Since it is coastal city, it is severely affected by floods and typhoons. There are slum areas in hazard-prone sites. Navotas should test the effectiveness of early warning system, if existent and operational. The use of loss data or damage projections will help build the case among decision-makers for investing in risk reduction measures such as early warning systems, especially so since Navotas is an important supplier of fish to Metro Manila.

3. Building a culture of safety and resilience

The city should try to increase the resident's awareness of the threats and impacts of disasters and enhance the participation of residents in community activities where they can get information of disaster risk reduction and climate change adaptation. The inclusion of DRR knowledge in relevant sections of the school curriculum at all levels must be promoted, as well as the use of other formal and informal channels to reach the youth and children with disaster and hazard information.

4. Reducing the risks in key sectors

City officials should address the city's very low economic resilience. A large percentage of the city's population is below the poverty line, severely affecting their coping capacity. The city must encourage residents to get multiple sources of income and not just concentrate on fishing and related livelihoods. In addition, the city must effectively maintain the pumping stations built in almost all the barangays so that the city will again be spared from the impact typhoons like Ondoy. While Ondoy caused heavy damages in terms of lives and properties in other parts of Metro Manila, notably Marikina and Pasig, Navotas was not gravely affected. The pumping stations of Navotas benefitted majority of the population by eradicating the problem of perennial flooding. It has definitely improved the living condition of the residents.

5. Strengthening preparedness for response

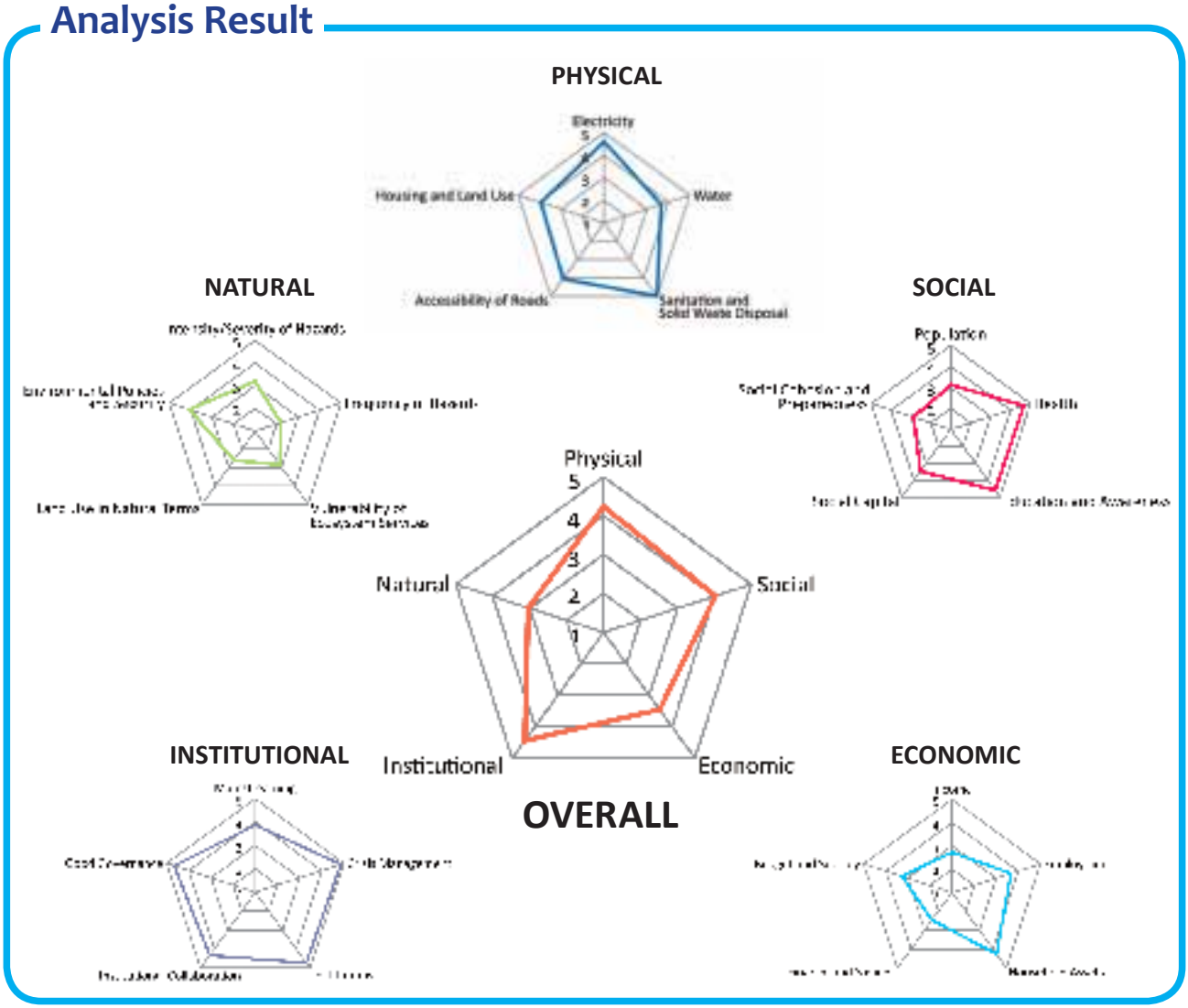
The higher frequency and intensity of floods and typhoons in the future will significantly impact the poor residents of Navotas since they have limited to cope with added stress. Protecting and restoring natural ecosystems along the Manila Bay shoreline is a good adaptation measure, which may prove to be highly cost-effective. Coastal mangrove forests can help minimize wave energy from storms and buffer the coastline from impacts. Relocating communities in high-risk areas will help in minimizing casualties and damage to properties.

http://en.wikipedia.org/wiki/File:Paranaque_City.JPG

City Profile and Overall CDRI

Parañaque is the second least densely populated city in Metro Manila. However, it has the third fastest population growth among the cities of Metro Manila. Recent awards conferred on the city include the distinction in 2009 for having established 30 Gawad Kalinga communities in the city. The record makes Parañaque the second best local government unit in Metro Manila in the implementation of its socialized housing program for the city's urban poor. For continuously introducing new concepts and innovations in health care, the Parañaque city government was one of the 2009 Galing Pook Award for Outstanding Local Governance recipients. It also won the 2008 Award for Healthy City with Good Dynamics and Award for Creative Development in Healthy Cities; and the 2006 Award for Progressive Cities with Great Potentials, all from the Alliance for Healthy Cities and the World Health Organization. In addition, in 2006, Parañaque received the Anvil Award of Excellence in Public Relations for Environmental Protection. Overall, Parañaque has high physical, social, and institutional resilience and moderate economic and natural resilience.

Analysis Result



Physical

Parañaque has a perfect score in Sanitation and solid waste disposal. It has a low score in Water and Housing and land-use. The percentage of non-permanent structure (shanties of informal settlers and other similar illegal structures constructed without a building permit, like vendor carts) is high. The percentage of roads that remains accessible during catastrophic floods (i.e. once in 50 years) is estimated to be below 15%. Poor or inadequate drainage systems, lack of box culverts, and indiscriminate throwing of trash along the sidewalks and esteros (canals) all contribute to compounding the city's flood problem.

Social

The city has a low score in Social capital and in Social cohesion and preparedness during a disaster. Less than a third of the city's population participate in community activities. Less than half of the households are prepared for a disaster in terms of logistics, materials, and management. Also, less than half of the city's population are willing to provide shelter or emergency support for affected people after a disaster.

Economic

Parañaque has a low score in Income and Finance and savings. There is a large percentage of the city's population that live below the poverty line. The average number of sources of income per household is low. The availability of a credit facility in the city's financial institutions to prevent disasters is limited, if not nonexistent. The habit of saving money of the city dwellers is minimal.

Institutional

For Parañaque officials, it is at the city level that emergencies are most felt so the city should be able to carry out rescue, evacuation, relief, and rehabilitation. A City Disaster Contingency Plan was formulated in 2005 to clarify the role of the city government and its various departments before, during, and after a disaster strikes the city. The major concern was that there was confusion and overlapping of functions and duties among the different departments, especially during emergencies. The city has a low score in Mainstreaming of disaster risk reduction and climate change adaptation. The incorporation of disaster risk reduction and climate change adaptation in the city's school education curriculum is limited. The frequency of disaster training for emergency workers must be increased. Lastly, collaboration and cooperation with civil society (volunteers and CBOs), the academe, the media, and other stakeholders must be improved.

Natural

Among the cities of Metro Manila, Parañaque has the fifth highest natural resilience. The city has a low score in Frequency of natural hazards and in Land-use in natural terms. There is a high frequency of floods and typhoons. The quality of urban biodiversity is only moderate. There are many settlements located on hazardous areas. The geographical location of Parañaque within Metro Manila made it susceptible to typhoons and floods. The city is disaster prone in this sense with the occurrence of more than twenty typhoons annually that usually hit the country. Strong winds damage homes, topple electric posts, break ornamental and fruit bearing trees.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

There is a need for enhanced action on adaptation and the provision of financial resources for it. As resources are limited, it is essential for available funds to be well targeted to the people who need them the most, those located in areas most vulnerable to climate-related hazards. Avoiding loss of lives and livelihoods should continue to be a priority of the city. A holistic approach can improve effectiveness and cost-efficiency of disaster risk reduction programs. Reference points or benchmarks against which a program's success can later be measured should be set in the planning stage.

2. Improving risk information and early warning

There are many settlements in hazard-prone areas. The city should set-up early warning systems for coastal and river flooding and storm surges. The early warning system should generate and disseminate warnings in a timely manner and in a format understood by those at risk. Early warning "champions" in each barangay should be identified to help raise local awareness of the system.

3. Building a culture of safety and resilience

Parañaque should work on increased public awareness and education to enhance disaster risk reduction. The city government should be proactive in engaging the participation of the citizens. There are a variety of activities to do this: motorcade; hanging of streamers; photo exhibit; orientation on disaster management policies and guidelines; tree planting; training on stress debriefing; seminar workshop on damage assessment and needs analysis; awarding of best first-aid teams; orientation on typhoon and flood awareness; training on family and community disaster preparedness; Mass for disaster victims; etc.

4. Reducing the risks in key sectors

The city should address problem on shanties and other non-permanent structures like vendor carts. Coastal protection should be in place, like the development of infrastructure such as drainages. Unless construction projects and rehabilitation plans are undertaken in the flood prone areas of the city, floods will continue to be a major problem whenever heavy rains occur. The recent Typhoon Ondoy inundated several communities in the city, especially those near the Parañaque River and the esteros. It also caused monstrous traffic as several areas. Unless construction projects and rehabilitation plans are undertaken in the flood prone areas of the city, floods will continue to be a major problem whenever heavy rains occur. The recent Typhoon Ondoy inundated several communities in the city, especially those near the Parañaque River and the esteros. It also caused monstrous traffic as several areas.

5. Strengthening preparedness for response

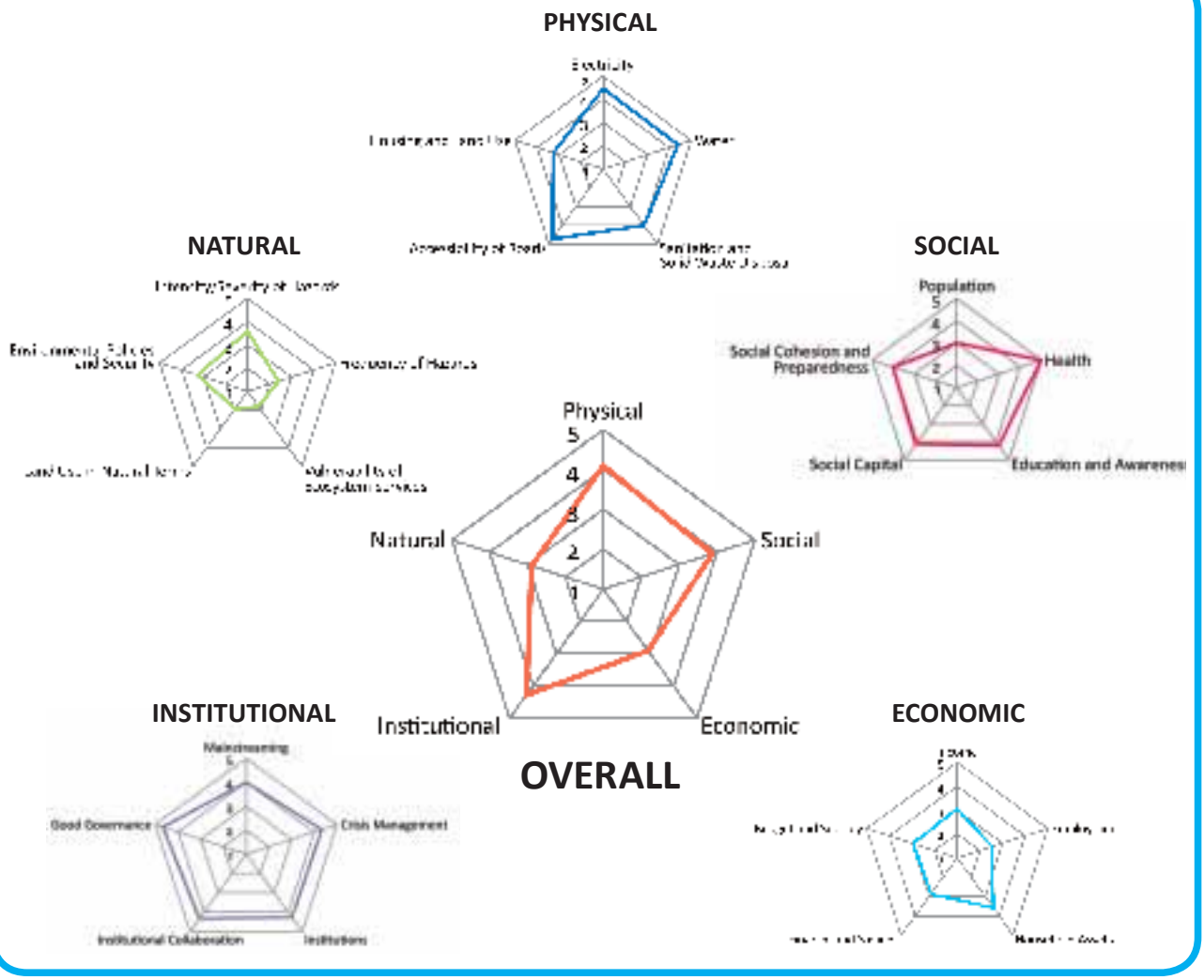
Public-private partnerships are important in disaster preparedness. Because the threat from hydro-meteorological hazards affect both public and private interests alike, public-private collaborative actions can offer opportunities to pool resources and expertise to act jointly to reduce risks and potential losses. They can therefore help enhance the resilience of communities. A good practice of the city is the Parañaque Elite Rescue Unit (PERU), composed of doctors, nurses, and paramedics trained in Emergency Medical Services. PERU was established in 2007 in response to the lack of trained personnel that can respond to emergency situations like car accidents, fire rescue, flood rescue, etc. PERU is under the City Health Office and is equipped with ambulances and rescue equipment.

PASAY CITY

City Profile and Overall CDRI

Pasay serves as the international gateway not just to Metro Manila but to the whole Philippines, hosting both the domestic and international airports within its jurisdiction. As such, Pasay holds the visitors' first and last impression that is crucial to the Philippines' business and industries, especially tourism. Pasay City is bounded in the west by Manila Bay. Among the cities of Metro Manila, Pasay has a greater area controlled by agencies of the national government, covering more than half of its total land area. Pasay is one of the ten recipients of the Special Citation on Local Capacity Innovations in 2006, from the Galing Pook Awards, the most prestigious among the award-giving bodies for exemplary local government units (LGU's) are recognized by a number of award-giving bodies. Overall, Pasay has high physical and social resilience, moderate social resilience, and low economic and natural resilience.

Analysis Result



Physical

Pasay has a low score in Housing and land-use and in Water. The percentage of non-permanent structure (shanties of informal settlers and other similar illegal structures constructed without a building permit, like vendor carts) is high. The uncontrolled withdrawal of groundwater for various uses has brought about saltwater intrusion in some of the coastal areas around Manila Bay.

Social

The city has a high score in Health but a low score in Population, considering the very large residential population and the equally large transient daytime population. The population density is high at 21,214 per square kilometer. Based on the city's April 2000 report, Pasay has about 33,433 settler families that can be considered as informal settlers/ urban poor.

Economic

Pasay has a low score in Employment, in Finance and savings, and in Budget and subsidy. The percentage of labor employed in the informal sector is high, more than 25%. The practice of saving money among the city's households is not widespread. The budget for climate change related disaster risk reduction measures is not sufficient. There is no access to disaster risk financing instruments. In 2000, Pasay had an estimated labor force of 291,800 representing 80.4% of the population. In spite of its highly urbanized character as evidenced by its numerous service enterprises, Pasay had only 84.5% of its total labor force gainfully employed.

Institutional

Pasay is among the first local government units in the country to come up with a disaster management manual. The manual is designed to provide the general public with information and guidelines on What to Do, Who to Call, Where to Get Resources, and How to Go About actions and interventions before, during, and after disasters. In addition to the manual, the local government approved the Disaster Management Ordinance of Pasay City (Ordinance No. 3573) in 2006. Despite these, the city still needs to improve its mainstreaming of disaster risk reduction and climate change adaptation, based on its moderate score.

Natural

Among the cities of Metro Manila, Pasay has the third lowest natural resilience. The city has a low score in Vulnerability of ecosystem services and in Land-use in natural terms. The city is greatly affected by the high frequency of floods and typhoons. The urban air quality during the day is low. The urban water quality in rivers, creeks, and canals is poor. The intensity of urbanization is very high. There are settlements located on hazardous ground (e.g. steep slope, flood prone area). Pasay City is already experiencing a deterioration of its air quality. This may be attributed to the congestion of people, improperly maintained vehicles servicing them, and the significant percentage of pollutive firms with inadequate air pollution control devices and facilities operating within the area.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

DRR is a cross-cutting and complex issue that requires political commitment, public understanding, scientific knowledge, responsible development planning and practice, and people-centered early warning system and disaster response mechanisms. Progress in disaster risk reduction efforts should be monitored so that there will be a basis on how performance can be improved.

2. Improving risk information and early warning

Typhoons and their associated hazards, such as strong winds, storm surges, and floods, are among the most recurrent and damaging disasters the city is prone to. City personnel and volunteers can deliver warnings using megaphones and sirens to most at-risk communities like informal settlements. The process of communicating risks and preparing communities to respond to warnings through emergency drills is an opportunity to raise awareness.

3. Building a culture of safety and resilience

The Planning Officer should enhance the compilation, dissemination, and use of DRR information. Identification of unmet needs for information should be done. Information products should be disseminated widely and effectively. The awareness campaign can be implemented using different media like posters, billboards, and materials for children's education that are colorful and age-appropriate. Annual drills in schools for different hazards should also be established.

4. Reducing the risks in key sectors

Coastal protection should be in place. The city should also address poor sewerage and improper solid waste disposal. In areas along esteros and creeks occupied by a number of squatter shanties, wastes are directly discharged into the waterway, leading to the clogging of the already narrow drainage. Flooding is a major problem. Flood waters can reach up to 12-feet high and recede from 3 to 6 hours.

5. Strengthening preparedness for response

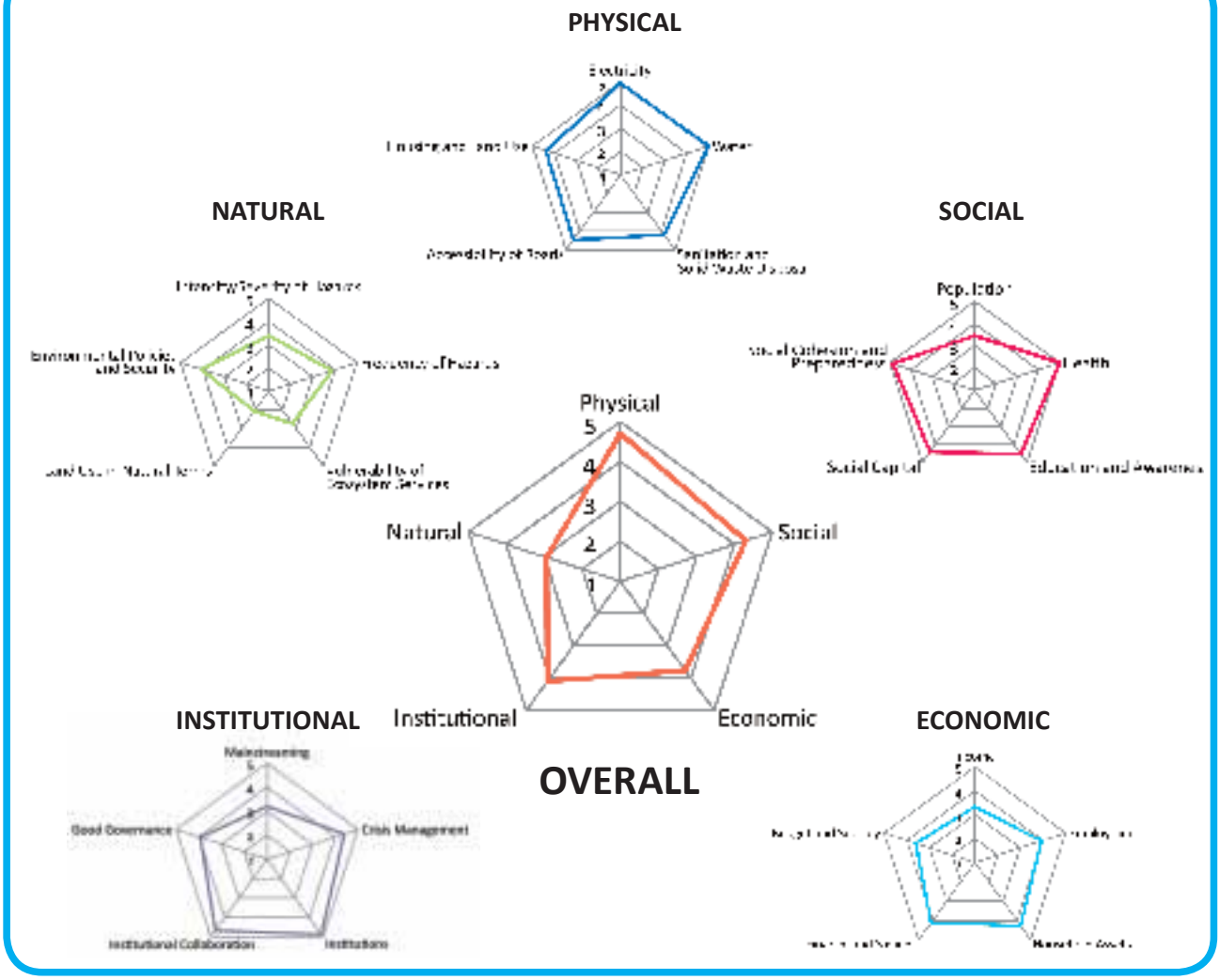
Effective disaster preparedness requires community participation. The involvement of residents in the design and implementation of activities helps to ensure they are properly customized to the actual vulnerabilities and to the needs of affected people. To foster buy-in to disaster preparedness programs, the city government must regularly inform, consult, and integrate stakeholder's views.

http://mishilo.image.pbase.com/v3/80/3642801/1/44275501.ortigasskyline2.jpg

City Profile and Overall CDRI

Pasig was converted from a municipality to a city in 1994. Now, aside from Makati, Pasig hosts one of the top business districts in Metro Manila, the Ortigas Center. Numerous high-rise office buildings, residential condominiums, commercial establishments, schools, and malls are located here. The headquarters of the Manila Electric Company (Meralco), Metro Manila's only electric power distributor, is in Pasig. The eastern part of the city is where most of Pasig's financial resources are primarily concentrated, including numerous factories, warehouses, and commercial facilities. The western part was dominated mostly with residential areas. In 2009, along with Marikina, Pateros, and Taguig, Pasig was badly affected by Typhoon Ondoy. Overall, Pasig has high physical, social, and institutional resilience; moderate economic resilience; and low natural resilience. Among the cities of Metro Manila, Pasig has the fourth highest CDRI.

Analysis Result



Physical
Pasig has the third highest score in the physical dimension among the cities of Metro Manila. It has a very high score in the Water paramater. Ironically, too much water hampered relief operations during Typhoon Ondoy. There were problems transporting relief goods as many roads remain flooded and covered with debris. Clearing operations had to be done to make the roads passable.

Social
Among the cities of Metro Manila, Pasig ranks fourth highest in terms of social resilience. It has a perfect score in Health but a low score in Population. The city's annual population growth is high, the fourth highest in Metro Manila (2.80% per year). The population density is also high at 19,913 per square kilometer.

Economic
Pasig has the highest score in the economic dimension. Almost all the residents have television, radio, and basic furniture. However Pasig has a low score in Budget and subsidy and must increase the city's annual budget targeting disaster risk management. It must also address the high percentage of its population below the poverty line by encouraging residents to have more than one income source per household and by not solely relying on the informal sector for income, as this source is quite unreliable.

Institutional
Pasig has a low score in Mainstreaming of disaster risk reduction and climate change adaptation and in Good governance. The incorporation of disaster risk reduction and climate change adaptation measures in city's land use plans is limited. The integration and implementation of disaster risk management plans/policies are also limited.

Natural
Pasig has a low score in 3 out of 5 parameters: Intensity/severity of natural hazards in the past 12 months, Vulnerability of ecosystem services, and Land-use in natural terms. Pasig was one of the worst hit by Typhoon Ondoy, along with Marikina. The intensity of urbanization is very high. The urban soil quality is moderate. There are settlements located on hazardous ground (e.g. steep slope, flood prone area). The total area of urban green space (parks, trees, forests, etc.) is low, estimated at less than 1% of the city's land area.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority
The city is in the best position to identify its own priorities for adaptation and the corresponding appropriate interventions. A multi-sectoral stakeholder and community engagement process should be employed. Affected parties need to be part of the creation and implementation of adaptation solutions in order for them to be equitable and effective.

2. Improving risk information and early warning
Information and early warning save lives. The city must use available information to forewarn residents, especially the poor, of impending hazards. It is better to prevent disasters than to rescue people in distress. The city should tailor the early warning system to the needs of the communities (e.g., in addition to radio or TV announcements, use sirens, warning flags, church bells, drums, loudspeakers, volunteers knocking door-to-door, etc. Multiple communication media should be used to disseminate warnings.

3. Building a culture of safety and resilience
The city should encourage private and commercial enterprises to raise awareness among their employees and create incentives for employees' wider involvement in awareness campaigns. As part of their corporate social responsibility (CSR), the city should ask these companies to organize workshops, forums, and educational activities for local communities.

4. Reducing the risks in key sectors
Only by paying attention to changes in topography, demographic growth, and urban development over time can the extent of flooding be correctly assessed. The city should continue supporting initiatives to rehabilitate Pasig River as it is vulnerable to flooding during times of very heavy rainfall. Disaster can be reduced by applying building and zoning standards to protect critical infrastructures, such as hospitals, schools, and homes. The city must help the residents in accessing effective insurance and micro-finance initiatives that can help transfer risks and provide additional resources for household preparedness.

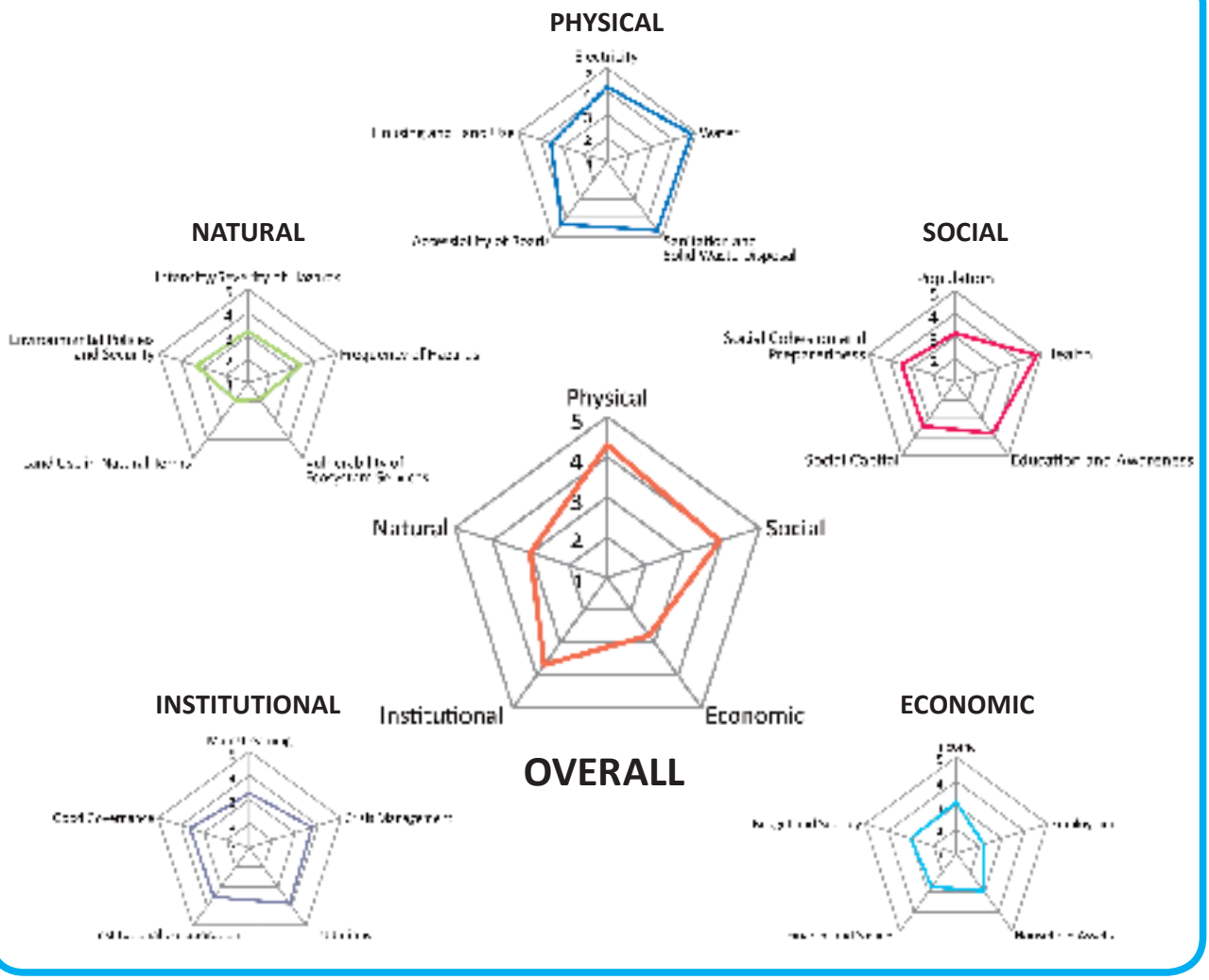
5. Strengthening preparedness for response
Disaster preparedness takes practice. Learning from Typhoon Ondoy, programs like health systems to combat floodwater-borne diseases like leptospirosis should be implemented by Pasig to help prevent the spread of epidemics. Vaccines and medicines should be procured in a timely manner to prevent outbreaks from happening again. Good housekeeping and sanitation should be promoted to the residents to contain the proliferation of rats, mosquitoes, flies, and other possible carriers of infectious diseases. Stockpiling before the start of the rainy season of commonly needed supplies in evacuation centers, like bottled water, noodles, used clothes, blankets, etc. should be done by the city.

PATEROS MUNICIPALITY

City Profile and Overall CDRI

Among the 17 local government units (LGUs) of Metro Manila, Pateros is the only one that is not yet a city. It is still only a municipality. It is the smallest LGU in Metro Manila in terms of both population and land area. 92% of the land area of Pateros is classified as residential. It is the second most densely populated city in Metro Manila and has the lowest GDP per capita. Overall, Pateros has high physical resilience; moderate social, institutional, and natural resilience; and low economic resilience. Among the local government units of Metro Manila, Pateros has the third lowest CDRI.

Analysis Result



Physical

Pateros has a low score in Housing and land-use. The percentage of non-permanent structures (shanties of informal settlers and other similar illegal structures constructed without a building permit, like vendor carts) is high. The percentage of houses above normal/flood water logging is less than 50%, explaining why Pateros is one of the badly hit LGUs by Typhoon Ondoy.

Social

Pateros has a low score in 3 out of 5 parameters: Population, Social capital, and Social cohesion and preparedness before a disaster. The population density is second highest in Metro Manila at 29,495 per square kilometer. The ability of the city's communities to build consensus and deliver shared interest is limited. The preparedness of the households for a disaster in terms of logistics, materials, and management is limited.

Economic

Pateros has a low score in 3 out of 5 parameters: Employment, Finance and savings, and Budget and subsidy. The major economic activities of Pateros are services, cottage industries, tourism, and manufacturing. The percentage of labor unemployed in the formal sector is high. Consequently, the percentage of labor employed in the informal sector is high also. The effectiveness of credit facility after a disaster for urban poor or low-income groups is low. The city's annual budget targeting disaster risk management is not sufficient.

Institutional

Pateros has a low score in Mainstreaming of disaster risk reduction and climate change adaptation and in Institutional collaboration with other organizations and stakeholders. Pateros needs to work on the incorporation of disaster risk reduction and climate change adaptation in the municipality's environmental plans and policies (e.g., flood risk, biodiversity, urban greenspace, air quality, etc.). It should also deal with its dependency to external institutions/support during and after a disaster.

Natural

The municipality has a low score in Vulnerability of ecosystem services and in Land-use in natural terms. Pateros is affected by the high number of typhoons that pass by Metro Manila every year. The urban water quality is poor. There is high risk of increasing level of urban water salinity. There are settlements located on hazardous ground (e.g. steep slope, flood prone area). The extent of the city area vulnerable to climate-related hazards is high.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

Pateros must integrate disaster risk reduction into development policies and planning at all levels of the local government, including in poverty reduction strategies. There should be a coordinated and participatory process in engaging the residents in reducing risks and enhancing community resilience. To increase meaningful citizen participation in the institutionalization of DRR, the municipality can provide support mechanisms for the participation of people's organizations (POs) and civil society organizations in various programs and projects.

2. Improving risk information and early warning

Early warning is widely accepted as a crucial component of DRR. Advance warnings mean the difference between life and death. For the effective communication of warnings, alerts should be short, simple, and precise. Residents should be encouraged to provide feedback on the effectiveness of the early warning system set up to trigger improvement of the system.

3. Building a culture of safety and resilience

Building a culture of resilience relies on how aware and informed local leaders and community residents are about DRR. Awareness is the first step toward action. Awareness campaigns aim to change behaviour by altering social norms and attitudes. The municipality should promote the inclusion of DRR in school curricula and develop training and learning programs on DRR at the community level.

4. Reducing the risks in key sectors

Although majority of its land is considered residential, the municipal officials can coordinate with barangay officals to establish green and open spaces to improve overall environmental quality and facilitate movement in this very crowded area. Pateros must pursue the sustainable use and management of ecosystems, through better land-use planning and development activities, to reduce risks and vulnerabilities.

5. Strengthening preparedness for response

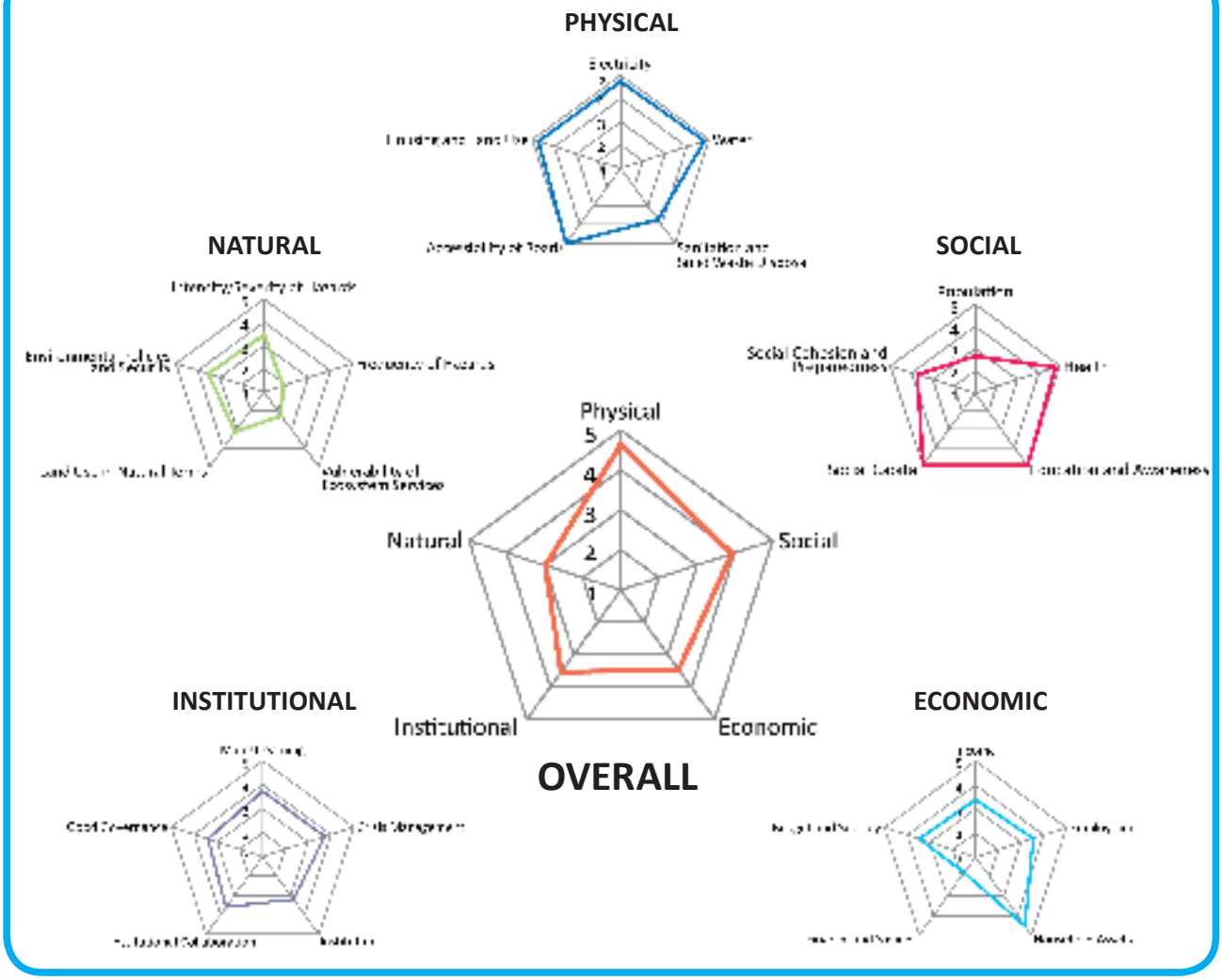
There is a need to update the list of evacuation centers and identify areas that are at risk during typhoons. Identification of resources and partners like NGOs with programs on disasters should be undertaken. Reorganization of the Barangay Disaster Coordinating Councils is highly recommended, along with the dissemination of IEC materials on disaster preparedness. The municipal officials should further enhance the interaction and cooperation among stakeholders and related organizations in improving disaster preparedness.

QUEZON CITY

City Profile and Overall CDRI

With a population of 2.7 million, Quezon City is the largest city in Metro Manila. It is a city of the young. About half of the population are less than 24 years old. Quezon City also has the widest land area at 161.12 square kilometer. It is the only city in Metro Manila that has substantial expansive lands still available for development. It has the second fastest population growth among the cities of Metro Manila. Overall, Quezon City has high physical resilience; moderate social, economic, and institutional resilience; and low natural resilience.With a population of 2.7 million, Quezon City is the largest city in Metro Manila. It is a city of the young. About half of the population are less than 24 years old. Quezon City also has the widest land area at 161.12 square kilometer. It is the only city in Metro Manila that has substantial expansive lands still available for development. It has the second fastest population growth among the cities of Metro Manila. Overall, Quezon City has high physical resilience; moderate social, economic, and institutional resilience; and low natural resilience.

Analysis Result



Physical

Among the cities of Metro Manila, Quezon City has the fourth highest physical resilience. It has a high score in Accessibility of roads but low score in Sanitation and solid waste disposal. The percentage of solid waste recycled (both formal and informal: municipal solid waste management and the waste recycling activities of scavengers and waste pickers) is less than 50%. It has low capacity for alternative emergency electric supply (e.g., back-up generators, uninterruptible power supplies, etc.) to keep emergency services functioning (e.g., hospital, evacuation centers, etc.).

Social

The city has a high score in Education and awareness and in Social capital. However, its score in Population is low. The city's annual population growth of 2.92 is very high, second in Metro Manila after Taguig. A large percentage of the city's population live in slum area/urban informal settlement/urban poor areas. The Commonwealth area has one of the largest barangays in the Philippines. The area also plays host to one of the largest squatters' communities in the country. The population of the area is so big it is equivalent to a single highly-urbanized city.

Economic

Among the cities of Metro Manila, Quezon City has the fifth highest economic resilience. The city has a low score in Finance and savings. The percentage of youth unemployed in the formal sector is high. The percentage of the city's household properties that are under any sort of insurance scheme is below 20%. The housing shortage is becoming more and more pronounced as the population increases. It is estimated that 40% of the population are in need of shelter, most of whom are urban poor. Informal settlers occupy not only vast tracts of public and private lands but also riverbanks and creeksides.

Institutional

Quezon City has a low score in Effectiveness of city's institutions to respond to a disaster. The availability and efficiency of trained emergency workers during and after a disaster is limited and not sufficient to serve the city's 142 barangays. The integration and implementation of disaster risk management plans/policies is also limited and must be improved.

Natural

Numerous rivers and creeks crisscross Quezon City. Flash floods occur in several places particularly during heavy downpour caused by clogged drainage inlets and pipes. Some of the roads and streets were flooded due to creek overflow and clogged drainage inlets and canals caused by the indiscriminate practice of residents and business establishments of dumping their garbage in Metro Manila's creeks, rivers and canals. The tree branches and leaves which littered the roads contributed also to the clogging of the canals. The city has a low score in Frequency of natural hazards and in Vulnerability of ecosystem services. There is a high frequency of floods and typhoons. The urban air quality is poor as well as the urban water quality in bodies of water.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

There is a need to understand the impact of land use planning, urban settlement, and construction control to vulnerabilities to natural hazards. For example, the influx of informal settlers may have pushed the people to live in unsafe sites like the Payatas area and near polluted creeks. The challenge is to develop effective policies, programs, and strategies that will help in managing urbanization to ensure sustainable development. Interventions that address population and development holistically are required.

2. Improving risk information and early warning

There is a need to publicize flood prone areas with large, noticeable signs for the public. The early warning system can be customized to the needs of the communities (e.g., in addition to radio or TV announcements, use sirens, warning flags, church bells, drums, loudspeakers, volunteers knocking in each house, etc. Multiple communication media should be used to disseminate warnings.

3. Building a culture of safety and resilience

Disaster risk mitigation should not be considered as an exceptional or one-time activity but rather as an ordinary one which should be observed by the government officials and the community everyday and everywhere in the normal conduct of activities. Disaster education is needed in sensitizing the public about the critical garbage situation that compounds natural hazards.

4. Reducing the risks in key sectors

There is continued growth of informal settlements. The increasing number of informal settlers occupying idle lands and unsafe sites near the creeks must be immediately addressed to prevent the worsening of the present condition. The need for safe housing is becoming more and more pronounced and strict conformance to building codes must be enforced to prevent damage or collapse due to typhoons and heavy rains. Unsanitary and inefficient solid waste disposal should also be addressed. Declogging of the canals, streams, and rivers is imperative given the severe flooding affecting many of the low areas in the city.

5. Strengthening preparedness for response

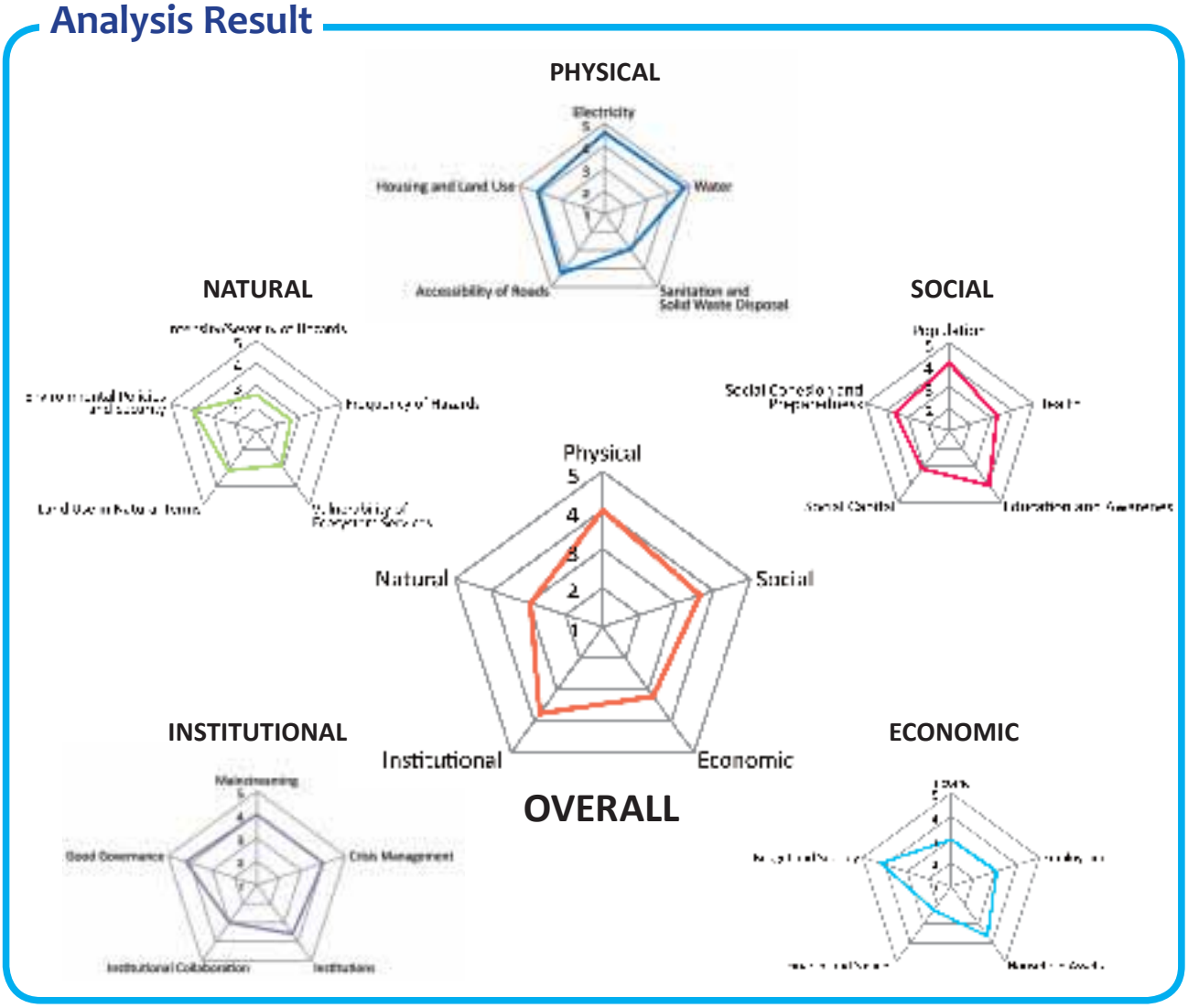
In preparation for inclement weather, the Quezon City Engineering Department formed a 24/7 flood control team that will address the city's emergency flooding situation anytime. Other stakeholders and residents must also do their share in being prepared for disasters. Promoting the spirit of volunteerism, especially among the youth, will contribute to the disaster resilience of Quezon City.

http://www.flickr.com/photos/smooths/2500836712/

City Profile and Overall CDRI

The first battle of the Philippine Revolution, that achieved for the country its independence from Spain, began in San Juan in 1898. San Juan is the second smallest city in Metro Manila in terms of both land area and population. It has the second slowest population growth among the cities of Metro Manila (tied with Navotas). It has the third highest GDP per capita. It was converted from municipality to city only in 2007. The presence of squatter settlements is a problem the city government has to perennially contend with. Overall, San Juan has high physical resilience; moderate social, economic, and institutional resilience; and low natural resilience. Among the cities of Metro Manila, San Juan has the second lowest CDRI.

Analysis Result



Physical

Among the cities of Metro Manila, San Juan has the second lowest physical resilience. It has a low score in Sanitation and solid waste disposal. The city needs to increase the percentage of solid waste recycled (both formal and informal: municipal solid waste management and the waste recycling activities of scavengers and waste pickers). It has low capacity for alternative emergency safe water supply (e.g., water purification system, stored water, etc.).

Social

San Juan also has the second lowest social resilience among the cities of Metro Manila. The city's population density is high: 20,907 per square kilometer in 2007. The population of San Juan is relatively young. 27% or 32,165 people of the town's inhabitants belong to the age bracket under 1-14 years old. The city has a low score in Health and in Social capital. The capacity of the city's health facility to face emergency/hazardous situation is poor. The extent of the city's population that participate in community activities is low. People don't evacuate voluntarily whenever there is an impending disaster.

Economic

San Juan has a low score in Income and in Finance and savings. The percentage of labor employed in the informal sector is high. The average number of sources of income per household is low, most of the time only one. There is limited or no access to a disaster risk financing framework/instrument.

Institutional

The city has a low score in Institutional collaboration with other organizations and stakeholders. The interconnectedness (network)/collaboration with neighbouring cities for emergency management during and after a disaster are limited. The city's institutional collaboration with national government during and after a disaster is poor.

Natural

San Juan has a low score in 3 out of 5 parameters: Intensity/severity of natural hazards in the past 12 months, Frequency of natural hazards, and Vulnerability of ecosystem services. There is high severity and frequency of floods and typhoons. The urban water quality in bodies of water is very poor. Areas along the western boundary rimmed by the San Juan River are sometimes flooded. Approximately, 10% of San Juan has been rendered unfit for development due to high flood risk and level slope.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

Careful planning that enables wide participation through selection of common time, convenient location, and agreeable conditions of meetings will facilitate the task of engaging multi-stakeholder dialogue for systematic coordination for DRR and CCA. Providing regular training to barangay disaster coordinating councils is encouraged.

2. Improving risk information and early warning

An early flood warning system for local communities will not only save lives but will also substantially reduce damage costs. The local officials should initiate city-wide risk assessments to provide a more complete and regularly updated picture of the city's risk and allow decision-makers to better set priorities for action. The city may invite external experts and practitioners involved in hazard and vulnerability assessments to help in documenting and mapping capacities and vulnerabilities.

3. Building a culture of safety and resilience

Appropriate awareness-raising programs based on the needs of the communities should be carried out. The city officials should be tireless in regularly encouraging the public to be always vigilant against disasters. San Juan should provide easily understandable information on disaster risks and preparedness to encourage and enable residents to take action to reduce risks and build disaster resilience.

4. Reducing the risks in key sectors

The city should ensure that a significant amount of land area is reserved as green space. It must incorporate DRR in environmental and natural resources management. In addition, it should establish mechanisms for increasing the disaster resilience of the urban poor. The impoverished communities are the most vulnerable and have the least ability to recover.

5. Strengthening preparedness for response

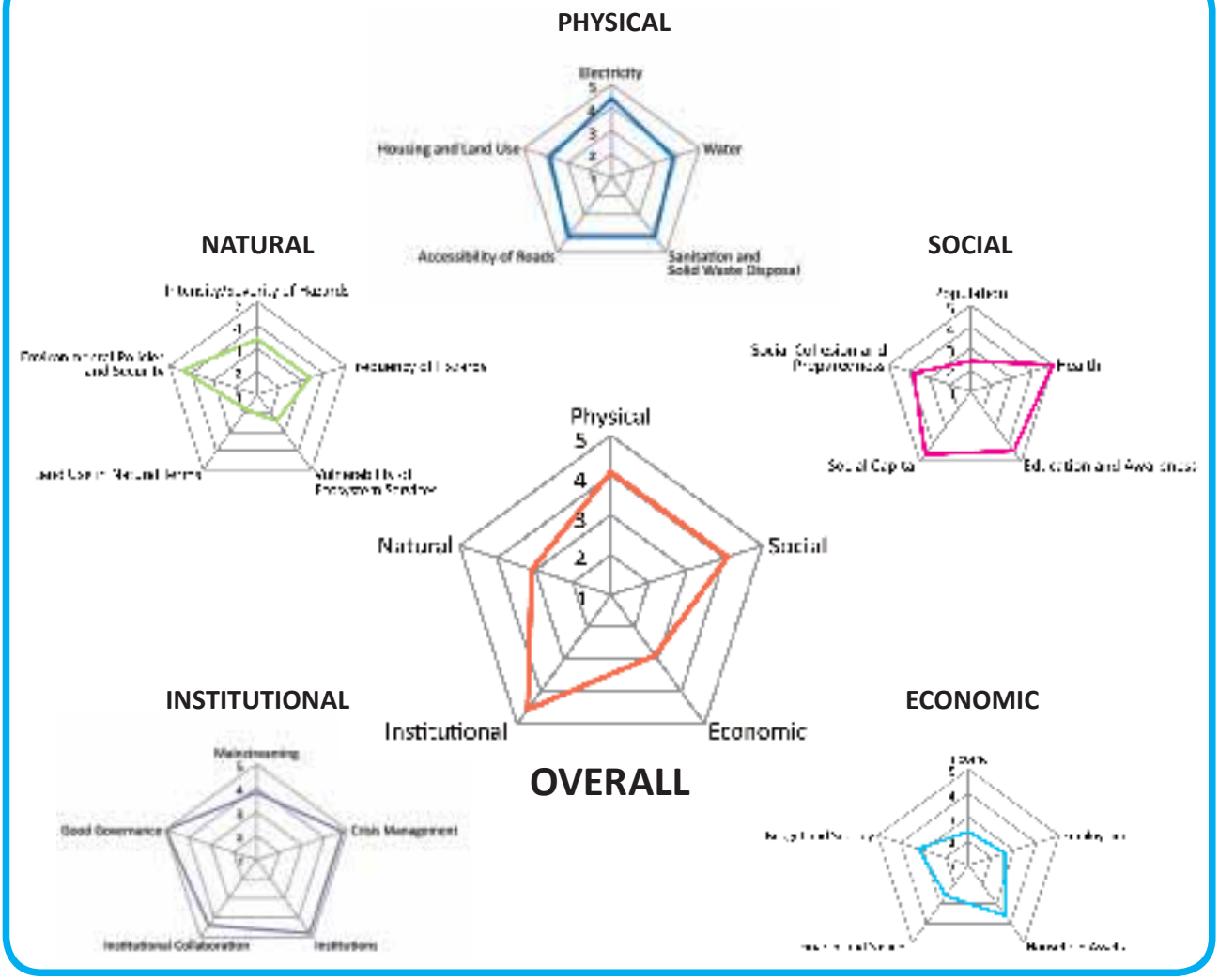
All concerned sectors should be in communication with one another. Linkages among stakeholders must be established. Partnerships must be explored to make the communities safer. The city government should take the lead in clarifying functions and division of responsibilities among the different actors.

TAGUIG CITY

City Profile and Overall CDRI

Taguig is the third largest city in Metro Manila in terms of land area. It has the fastest population growth among the cities of Metro Manila. The city ranked first among Philippine cities in the Ease of Doing Business Index, conducted by the World Bank's International Finance Corporation. The city has now become the new symbol of professionalism to all local government units in the country. Taguig was also one of the Galing Pook awardees in 2009, being cited for its “Facilitating Access to Social Services” through the Taguig Citycard, an identification card system that allows the residents to have discounted or free access to a wide range of social services and benefits such as free education, hospitalization, funeral assistance, and housing program. Overall, Taguig has high physical, social, and institutional resilience; moderate economic resilience; and low natural resilience.

Analysis Result



Physical

The percentage of roads that remain accessible during catastrophic flooding (i.e. once every 50 years) is low. During normal times, traffic flows smoothly on well-planned streets in the more developed parts of the city. There is adequate supply of electricity. So far, more than 70% of Taguig receives adequate water supply resulting from several pipelining projects. Flooding is now less likely in Taguig with the city working overtime to clean, dredge, and rehabilitate all the creeks, waterways and rivers in Taguig. The city's Clean and Green manpower keeps Taguig's streets clean and sidewalks garbage-free.

Social

Taguig's annual population growth is the highest in Metro Manila: 3.82% in 2007, mostly from in-migration. The native Taguigeños is now a minority with only 30% of the population and the new settlers comprise the majority at 70% of the population. The population density is 12,810 per square kilometer. People don't evacuate voluntarily whenever there is an impending disaster.

Economic

A large portion of the population lives below the poverty line. The percentage of the city's household asset under any sort of insurance scheme is low. There is no access to disaster risk financing instruments. To assist residents with issues of unemployment, the local government has set up the Public Employment Service Office, or PESO, which has effectively boosted employment levels by 65% by endorsing applicants and conducting over 50 job fairs. The PESO has successfully placed over 31,000 jobseekers since 2001.

Institutional

One of the city's resounding battlecry is "Lahat panalo kapag sama sama tayo" (We all win when we work together). On a community level, Taguig officials continuously organize events and activities that inspire teamwork, unity, and civic pride. In the same spirit of unity, the City of Taguig has teamed up with the public and private sector in order to elevate the city to its premier status, from its education system, social welfare, to its development.

Natural

There is high severity and frequency of floods and typhoons. The quality of urban biodiversity is very low. The level of urbanization is high. There is a significant loss of urban green space (parks, trees, forests) due to development of infrastructure, housing, etc. over the last 50 years. Typhoon Ondoy wreaked havoc on the city last year.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

Taguig is now one of Metro Manila's fastest-growing cities. City leaders must take in mind that development usually comes with hefty ecological costs. They must ensure that Taguig's development is done responsibly, through sustainable, low-impact, and climate-conscious steps. Progress should not take precedence over the fragile ecosystems. The city should mainstream adaptation planning and climate resilience into economic development planning over the short, medium, and long term.

2. Improving risk information and early warning

When effective early warning systems provide information about a hazard to vulnerable residents and plans/guidance in taking action are in place, lives can be saved. Taguig should make sure install an early warning system in flood-prone areas of the city. Taguig should also disseminate hazard maps widely, especially in the city's official website and in schools and offices.

3. Building a culture of safety and resilience

Including DRR and CCA in formal, non-formal, and informal education can increase awareness of disaster prevention among students, who can pass on what they learned to other members of their family. Taguig should strengthen its network with schools and promote cooperation among disaster experts, city planners, residents, and other stakeholders. Taguig should regularly spearhead performing disaster awareness-raising activities.

4. Reducing the risks in key sectors

Protecting and restoring natural ecosystems along the Laguna de Bay shoreline is a good adaptation measure, which may prove to be highly cost-effective. The issues of informal or non-permanent housing along the lake should be addressed as priorities. Identification of zones that are available and safe for human settlement should be done. Coastal protection should be in place to build the capacity of the environment to withstand hazards by acting as natural storm buffers.

5. Strengthening preparedness for response

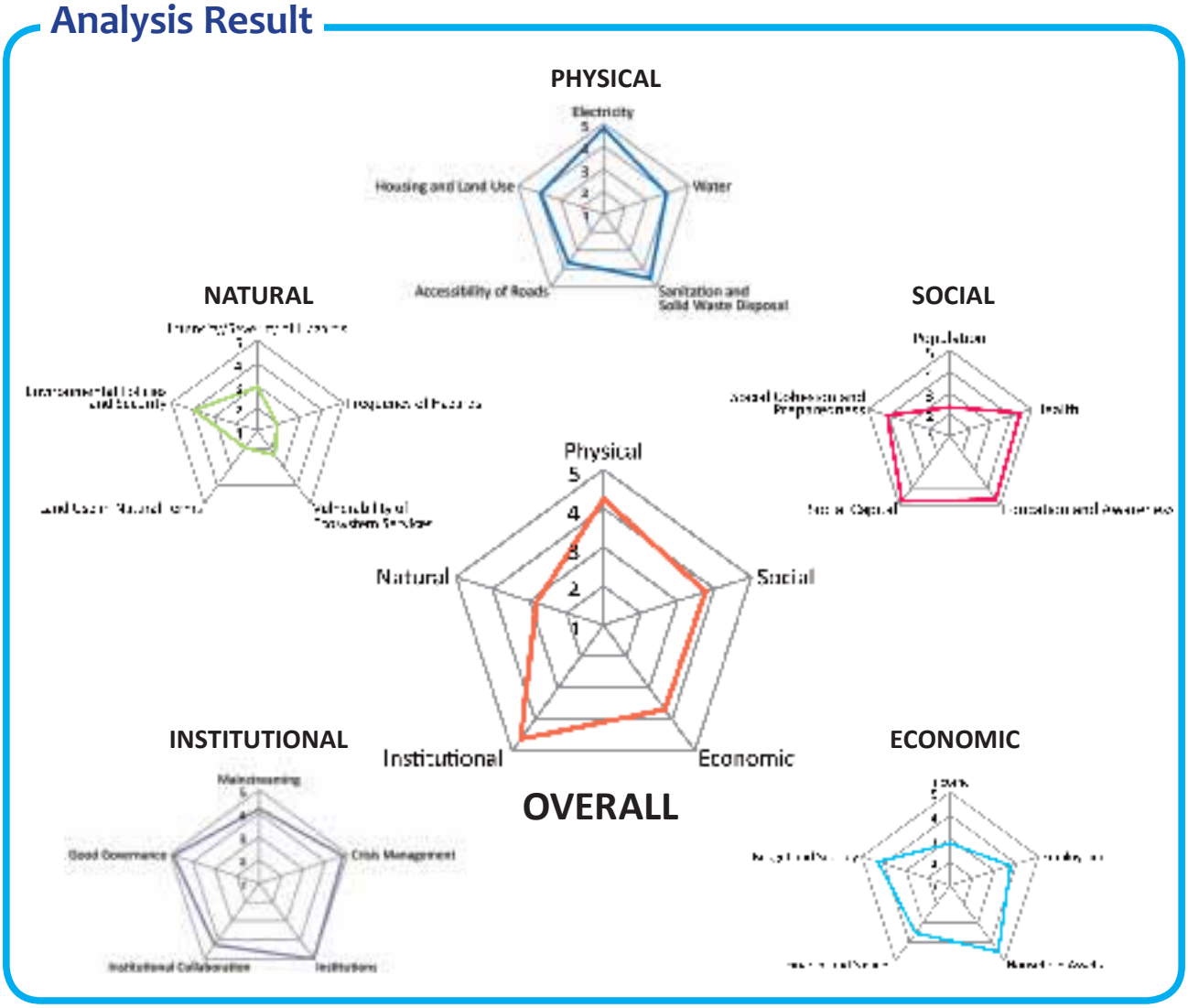
The city should prepare a list of all stakeholders in disaster preparedness, including their roles and responsibilities. Together, they should set priorities for action. The Disaster Council should effectively communicate plans and programs to the concerned communities. The city should maintain skilled emergency personnel through regular trainings and drills.

http://www.flickr.com/photos/womble67/4257195841/

City Profile and Overall CDRI

Valenzuela is composed of 32 barangays and has a land area of 44.6 square kilometres. Its population in 2007 was 568,928. According to the 2002 Metro Manila Solid Waste Management Report of the Asian Development Bank, Valenzuela has the highest number of identified recycling companies in Metro Manila. Based on the City's Ecological Solid Waste Management Plan as of 2001, only 60% of this wastes is collected, hauled and dumped in the Lingunan controlled dumpsite. About 5% is retrieved and recycled and the remaining 35% is strewn everywhere littering the city. Valenzuela shifted from contracting collection of wastes to self-administration of SWM operations in 1997 due to incidence of uncollected solid wastes and the increasing cost of hauling. SWM is being managed by the Clean and Green Office (CGO) and Solid Waste Management Office (SWMO). Overall, Valenzuela has high physical and institutional resilience, moderate social and economic resilience, and low natural resilience.

Analysis Result



Physical

Valenzuela has a low score in Accessibility of roads and in Housing and land-use. The percentage of buildings constructed following building code (for hydro-meteorological disasters like floods) is also low. The percentage of roads that remain accessible during catastrophic flooding (e.g., once every 50 years) is low. Out of 32 barangays (villages) of Valenzuela, 16 barangays are particularly flood prone due to tidal changes and heavy rains.

Social

Valenzuela has a low score in population. The city's population growth per year is high at 2.21%. The population density is 12,762 per square kilometer. The percentage of the city's population that is under 14 years old is high as well. It is a good thing voluntarism is very much alive in Valenzuela. Having demonstrated "unquestionable effectiveness" in times of disaster, the Valenzuela City unit of the Philippine National Red Cross (PNRC) was named as the Chapter of the Year for 2009, besting other more established units of larger urban areas. Some 1,300 volunteers were mobilized at the height of Ondoy calamity.

Economic

Among the cities of Metro Manila, Valenzuela has the second highest economic resilience. The city has a low score in Income and in Finance and savings. The percentage of the city's population that live below the poverty line is high. In 2002, one-third of all households in Valenzuela lived in depressed settlements. The percentage of households that depend on income from activities derived in the informal sector is high as well. The practice of saving money is not common.

Institutional

Among the cities of Metro Manila, Valenzuela has the fifth highest institutional resilience. The city has a perfect score in Effectiveness of city's institutions to respond to a disaster. The Unified Alliance of Organized Socio-Economic and Civic Organization Committee in Valenzuela, commonly known as VC Shares, is a good example of public-private collaboration.

Natural

Among the cities of Metro Manila, Valenzuela has the second lowest natural resilience. Valenzuela has a low score in 3 out of 5 parameters: Frequency of natural hazards, Vulnerability of ecosystem services, and Land-use in natural terms. There is high frequency of floods. Urban water quality in rivers is very poor. Tullahan River is one of the dirtiest rivers in the country. Most of the city area is vulnerable to climate-related hazards. The total urban green space is small. The intensity of urban morphology is high.

Policy Implications in Relation to the HFA Priorities for Action

1. Making disaster risk reduction a priority

Adaptation to climate change is crucial for Valenzuela's continued and sustainable economic growth. Adapting to climate change now will be much less costly and relatively easier than waiting until climate change impacts worsen. The support of city executives and community leaders to the task of institutionalizing climate change adaptation efforts will facilitate the success of these endeavors.

2. Improving risk information and early warning

A flood early warning system for local communities will not only save lives but will also substantially reduce damage costs. Valenzuela should initiate city-wide risk assessments to provide a more complete and regularly updated picture of the city's risk and allow decision-makers to better set priorities for action. Risks assessments identify both hazards to which residents are exposed and the city vulnerabilities. Risk assessments should consider the effects of urbanization (demographic changes), land-use change, environmental degradation, and climate change.

3. Building a culture of safety and resilience

Valenzuela should work on increased public awareness and education to enhance disaster risk reduction. The city should continue its active celebration of the National Disaster Consciousness Month and should line up several activities. As one of the mayor's priority thrusts is education, Valenzuela should promote the inclusion of DRR and CCA knowledge in the school curriculum at all levels and use formal, non-formal, and informal channels to reach the youth and children.

4. Reducing the risks in key sectors

Valenzuela should address the problem of non-permanent structures like vendor carts and shanties of informal settlers, especially those along rivers. It should consider improving the management of flood controls, such as pumping stations, and flood monitoring and warning systems. Insurance for industries located in flood-prone areas is advisable.

5. Strengthening preparedness for response

Valenzuela is a city very susceptible to climate change. It experiences flooding during the rainy season and during high tide. Valenzuela can increase its disaster resilience by supporting community-based adaptation. The city officials should meet and consult with various stakeholders regularly to widen their appreciation of the features of disaster preparedness. It will help if the city government can identify disaster preparedness "champions" in each of the slum communities so that the city will have an entry point in designing customized disaster preparedness programs for these communities.

Action Planning

City governments usually have very limited budgets devoted to disaster risk reduction and climate change adaptation efforts. Therefore it is necessary to set priorities in order to get something meaningful accomplished. And this is why action planning is so important. While a strategic plan dictates where we are going or why we are going there, the action plan is the plan that guides day-to-day work. Without an action plan, it is likely that the strategic plan will remain just a grand dream and will take us nowhere! There is a growing recognition that the success of any program or project hinges on the implementation of an action plan.

In assessing the disaster resilience of cities, the CDRI questionnaire survey asked city planning officers to evaluate their performance in 125 indicators (5 dimensions X 5 parameters per dimension X 5 variables per parameter). Although all the 125 indicators are relevant, the cities of Metro Manila should prioritize those that are really vital to enhancing disaster resilience of the region, given Metro Manila's unique combination of socio-economic and geographic circumstances and the set of limited resources available to it.

On November 5, 2009, representatives from the Planning Office of 12 out of the 17 cities of Metro Manila participated in the CDRI Action Planning Workshop conducted in Makati City. The 22 participants (please see list on the back of the front cover) were grouped into five, corresponding to the five dimensions of disaster resilience: physical, social, economic, institutional, and natural. Each dimension in the CDRI questionnaire has 25 questions. The tasks of each group were the following: (1) From the 25 indicators, choose three priority areas each that should be addressed in the short-term, medium-term, and long-term. (2) For each priority area, list down specific actions that can be performed by the cities in order to contribute to enhancing Metro Manila's disaster resilience. The participants were given 1 hour to brainstorm with group members and write their answers. After 1 hour, each

group was given 20 minutes to report their output and answer questions from members of other groups.

Action plans usually include the following elements: action to be taken, start date, completion date, participants, staff responsible, methods, resources required, expected output, performance indicators, etc. But given the very short time to do the workshop, the action planning was limited to choosing priority areas and suggesting specific actions for each priority area. Please see next five pages for the specific actions on how to enhance Metro Manila's physical, social, economic, institutional, and national resilience. The numbers inside parentheses correspond to the indicator number in the CDRI questionnaire. For example, in Collection of solid waste produced per day (3.3), "3.3" means that this priority area is the third indicator under the third parameter under the physical dimension (see Table 1).

We must bear in mind that the action plan is only as good as its implementation. Action planning for enhancing disaster resilience is very much like sailing. We start from where we are, chart a course to a destination, sail towards the goal, check our progress occasionally, and make course corrections en route. Success in making cities safer doesn't come by accident. It requires strategic planning (such as the Hyogo Framework for Action) followed by implementation of an action plan (such as the output of the CDRI workshop).

How Should Metro Manila's Physical Resilience be Enhanced?

	PRIORITY AREAS AND SPECIFIC ACTIONS
SHORT TERM Between now and the next 2 years	**Collection of solid waste produced per day (3.3)** • Regular (100%) collection of solid waste from communities • Identification and development of dumpsites and landfills that will be environmentally acceptable to the host community • Intensifying promotion of 3Rs of solid waste management: Reduce, Reuse, Recycle **Percentage of non-permanent structure (shanties of informal settlers and other similar illegal structures constructed without a building permit, like vendor carts) (5.2)** • Listing/recording informal settlers in hazard-prone areas • Relocation of identified households to safer areas • Promotion of urban redevelopment and renewal (rehabilitation of impoverished urban communities by renovation or reconstruction of housing and public works) **Status of water supply (status of daily water availability) (2.2)** • Identification of other sources for use in times of disasters. Designating alternate sources of water per community. (Main sources of water are private water distributors and deep wells and artesian wells.) • Educating households to store water or to look for their own alternative source (like identifying location of nearest purified water refilling stations).
MEDIUM TERM For the next 2 to 5 years	**Percentage of city population with access to toilets (hygienic latrine: pit latrine, water sealed latrine, or sanitary latrine) (3.2)** • Strict implementation of Sanitation Code in the cities • Prohibition of open defecation, especially directly to canals as unsafe water and human excreta are the main transmission routes of diseases like diarrhea, dysentery, gastroenteritis, parasitic worms, etc. • Assistance in the installation of public toilets in impoverished barangays **Percentage of houses with plinth above normal/flood water logging (5.3)** • Compiling statistical information on historical flood heights and updating city building requirements accordingly • Assisting households relocate from flood-prone areas to safer areas **Percentage of city population with legal access to potable water supply (including tap water delivered by domestic water companies and protected dug wells, but excluding purified water refilling stations, bottled water, etc.) (2.1)** • Data collection through surveys in the barangays • Identification of households with no access to potable water • Implementation of pipe-laying projects with water distributors to speed up the delivery of water services in the city
LONG TERM Beyond 5 years	**Percentage of city population with hygienic access to sanitation (connection to a public sewer, connection to a septic system, solid waste disposal, etc.) (3.1)** • Formulating policies for commercial establishments and industries to reduce or limit their production or use of plastics and styrofoam and imposing penalties or extra charges/taxes for amounts exceeding the limits for these materials. • Promoting the use of recyclable plastic bags and other environment-friendly products. **Total percentage of city's population living in the proximity of pollutive industries, landfills, and garbage dumpsites (5.5)** • Updating zoning ordinances and housing policies to prevent people from building houses near these polluted and dangerous places • Strict implementation of zoning ordinances and monitoring of unsafe areas **Water supply authority capable to supply the city's demand for water (2.3)** • Developing and promoting other sources of water other than from the existing water distributors to avoid a water crisis in the future • Evaluating the sustainability of groundwater extraction through deep wells given the concerns on land subsidence and saltwater intrusion which are already serious issues in coastal cities

How Should Metro Manila's Social Resilience be Enhanced?

	PRIORITY AREAS AND SPECIFIC ACTIONS
SHORT TERM Between now and the next 2 years	**Extent of affected people evacuate voluntarily after a disaster (5.5)** • Information dissemination on approaching disasters and on how to react accordingly • Issuing weather bulletin for timely factual information; continuous monitoring • Early warning devices to signal time to evacuate based on real-time data **Extent households are prepared for a disaster in terms of logistics, materials, and management (5.1)** • Information dissemination on how to prepare for upcoming dangers • Conducting school drills (earthquake, fire, evacuation drills); passing information from teachers to students and from students to their family • Using markers in flood zones, e.g., at a particular level, still OK but when critical level is reached, time to evacuate already **Extent of support to residents from NGOs/CBOs or religious organizations after a disaster (5.4)** • Providing NGOs and CBOs with list of needs or requirements; inform them what are the necessities in addition to canned goods and cash donations; sometimes blankets and clothes are more needed • Conducting annual forum for coordinated response to disasters • Sending "thank you" note to donors as a sign of appreciation and to strengthen relationships with them
MEDIUM TERM For the next 2 to 5 years	**Percentage of city's population live in slum area/urban informal settlement/urban poor areas (1.4)** • Relocation households in disaster-prone slum areas to safer places with livelihood opportunities • Monitoring at the barangay level to prevent groups of households from starting to form informal settlements • Putting markers designating disaster-prone areas **Capacity of city's health facility to face emergency/hazardous situation (2.4)** • Training more health personnel to address the problem of shortage of manpower to help in emergency responses • Procurement of additional emergency facilities and equipment • Coordination with national health agencies like the Department of Health (DOH) on what to do and what supplies are needed during city-wide emergencies **Percentage of city dwellers suffer from waterborne or vector-borne diseases every year (2.1)** • Intensifying support to DOH programs; strengthening collaboration with local and international NGOs that focus on waterborne and vector-borne diseases • Providing vaccines (e.g., for leptospirosis) in case of major floods with water expected to recede in weeks or months, like in the case of Typhoon Ondoy • Recruiting health volunteers as even if there are enough medicines to give out if there are too few knowledgeable volunteers, the medicines can't be distributed properly
LONG TERM Beyond 5 years	**Percentage of city's population growth per year (1.1)** • Strict implementation of family planning programs as these are frequently neglected; as our population grows we will have more problems since our resources are not increasing proportionately • Promoting education on reproductive health, like what are its benefits, how will it improve the quality of life of the family, what are the problems of having too many people in a given area, etc. • Recording how many people are coming in the barangay and how many are leaving to see if there are patterns of migration and come up with appropriate measures **Literacy rate of city's population (3.1)** • Establishment of alternative learning systems; one solution is adult education for those who are illiterate so they can cope up with the progress of the city; re-educating the teachers on how to teach effectively is another idea • Setting up barangay learning programs so people don't have to go outside their community to learn how to read and write; putting up daycare centers so children, especially those with illiterate parents can start learning at a young age **Extent of city's population participate in community activities (4.1)** • Formation of organizations within the community to increase involvement in community activities • Promotion of the volunteer system in community projects (bayanihan) • Intensifying community forums (talakayan/barangayan)

How Should Metro Manila's Economic Resilience be Enhanced?

	PRIORITY AREAS AND SPECIFIC ACTIONS
SHORT TERM Between now and the next 2 years	**Percentage of city's annual budget targeting disaster risk management (5.1)** • Optimization of the use of the 5% Calamity Fund for disaster preparedness programs and projects • Mainstreaming of CCA and DRR into the planning and budget processes through policy formulation **Availability of subsidies/incentives for residents to rebuild houses after the disasters (5.3)** • Inventory of existing financial institutions providing special loan packages for the rebuilding of damage houses • Collaboration with financial institutions in coming up with subsidy/incentive programs for disaster victims **Availability of subsidies and incentives for residents/institutions to receive/provide alternative emergency livelihood after a disaster (5.4)** • Inventory of existing government agencies and NGOs providing livelihood assistance to disaster victims • Review of existing livelihood programs at the city and barangay level to see if these can be expanded to cover post-disaster recovery • Collaboration with existing institutions providing livelihood programs in coming up if list of possible alternative livelihoods that are easy to setup after a disaster
MEDIUM TERM For the next 2 to 5 years	**Percentage of city's households have television or radio (3.1)** • Verifying the exact statistical figures by researching and reviewing past census and surveys • Regular monitoring and evaluation to bring percentage up to desired level of 91-100% **Percentage of city's population have mobile phone/telecommunication (3.2)** • Verifying the exact statistical figures by researching and reviewing past census and surveys • Regular monitoring and evaluation to bring percentage up to desired level of 91-100% **Percentage of city's population have motorized vehicle (3.3)** • Verifying the exact statistical figures by researching and reviewing past census and surveys • Regular monitoring and evaluation to bring percentage up to desired level of more than 60%
LONG TERM Beyond 5 years	**Availability of subsidies/incentives for residents/institutions to receive/provide emergency healthcare (5.5)** • Reviewing established healthcare programs at the city and barangay level • Establishing strong partnership with development partners and institutions **Access and availability of credit facility in the city's financial institutions to prevent disasters (4.1)** • Conducting a survey on the availability of credit facility for disaster prevention in the city's financial institutions • Evaluation of the effectiveness of financial institutions' credit facility for disaster prevention • Institutionalization of policies through the allocation of funds to establish/augment credit facilities for disaster prevention **Effectiveness of credit facility after a disaster for urban poor or low income groups (4.2)** • Regular monitoring and evaluation of the effectiveness of credit facilities for low-income groups • Regular review of policy innovations to come up with ideas of a more responsive credit facility • Strong coordination and linkage with development partners and institutions • Institutionalization of policies through the allocation of funds to establish/augment credit facilities for the urban poor

How Should Metro Manila's Institutional Resilience be Enhanced?

	PRIORITY AREAS AND SPECIFIC ACTIONS
SHORT TERM Between now and the next 2 years	**Availability and implementation of building codes led by city government (5.3)** • Strict implementation of building codes – especially in danger areas • Requiring perimeter easement and height restrictions to enhance disaster reduction **Existence and frequency to run drills for disaster scenarios led by city government (5.5)** • Conducting annual trainings for drill masters on how to conduct effective disaster drills **Effectiveness of emergency team to respond quickly AFTER a disaster (2.4)** • Conducting city-wide annual trainings for barangay emergency team members
MEDIUM TERM For the next 2 to 5 years	**Availability and frequency of regular disaster training programs for emergency workers (3.4)** • Budget allocation so training programs for emergency workers can be implemented **Effectiveness to learn from previous disasters (3.5)** • Improving disaster management programs based on experience in recent disasters **Accountability/transparency (e.g., dissemination of information) of city government during and after a Disaster (5.2)** • Timely information dissemination on what just happened (details on the disaster), what are being done by the city government (details on rescue and relief operations), and what will be done in the future (details on reconstruction and rehabilitation plans)
LONG TERM Beyond 5 years	**Incorporation of disaster risk reduction and climate change adaptation measures in city's land use plans (1.1)** • Reviewing and updating land-use plans especially those for flood-prone areas • Imposing continuous implementation of perimeter easement (e.g., no construction within 3 meters from rivers) **Incorporation of disaster risk reduction and climate change adaptation in city's school education curriculum (1.3)** • Tapping and tasking the school board to include risk reduction and climate change awareness in educational curriculum (e.g., in Science) • Conducting an orientation on disaster risk management at the start of class in each school year **Incorporation of disaster risk reduction and climate change adaptation in city's environmental plans and policies (e.g., flood risk, biodiversity, urban greenspace, air quality, etc.) (1.5)** • Updating comprehensive development plans to integrate DRR and CCA and other relevant issues

How Should Metro Manila's Natural Resilience be Enhanced?

	PRIORITY AREAS AND SPECIFIC ACTIONS
SHORT TERM Between now and the next 2 years	**Floods (1.1)** • Dredging and desilting of waterways • Promoting Disaster awareness and preparedness through IEC materials • Installation of flood warning system • Organizing rescue and disaster response teams • Relocation of settlers living in flood-prone areas **Loss of urban green space (parks, trees, forests) due to development of infrastructure, housing, etc. over the last 50 years (4.5)** • Converting idle lands into parks/mini-forests (e.g., bamboo forest) • Intensifying campaign for urban/backyard farming • Intensifying tree-planting activities **Existence and efficiency of waste management system (Reduce, Reuse, Recycle) (5.3)** • Stricter implementation of waste segregation at household level in compliance with Solid Waste Act • Establishing more MRFs (municipal recycling facilities) • Procurement of more bioreactors
MEDIUM TERM For the next 2 to 5 years	**Settlements located on hazardous ground (e.g. steep slope, flood prone area) – vulnerable exposure (4.3)** • Land banking for alternative housing projects (land banking is the practice of acquiring land and holding it for future use) • Community organizing (like the town-watching as presented by Dr. Takeuchi) – community participation needed • Incorporating in CLUP (comprehensive land use plan)/zoning ordinance prohibition of human activity **Compliance rate to environmental policies (5.1)** • Strict implementation of existing environmental policies (impose penalties for non-compliance) • Legislating additional policies like new ordinances to protect our city **Existence and sufficiency of environmental preservation policies (5.2)** • Crafting of relevant laws and/or review of existing policies on environmental preservation
LONG TERM Beyond 5 years	**Extent of city area vulnerable to climate-related hazards (4.1)** • Formulating/updating CLUP and other development plans with emphasis on disaster mitigation/prevention • Institutionalization of the disaster management office for continuity even if elected city officials change **Intensity of land-use – urban morphology (level of urbanization; extent of urbanized areas) (4.2)** • Formulating/updating CLUP and other development plans with emphasis on disaster mitigation/prevention • Institutionalization of the disaster management office for continuity even if elected city officials change **City is supplied with food after a disaster (food availability is secured; city has sufficient supply) (5.5)** • Establishing networks with private organizations/companies (e.g., Chamber of Commerce), NGOs • Implementing livelihood programs (agricultural) • Enhancing/increasing people's preparedness by practicing stockpiling of food with long shelf life

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Quezon City – http://www.quezoncity.gov.ph/
San Juan City – http://www.sanjuancity.com.ph/
Taguig City – http://www.taguig.gov.ph/
Valenzuela City – http://www.valenzuela.gov.ph/

About the Organizations

Kyoto University

The IEDM Laboratory of Kyoto University Graduate School of Global Environmental Studies targets to reduce the gap between knowledge and practice through pro-active field level, community-based project implementation in the field of environment and disaster risk management. Key research areas are: climate change adaptation, urban risk reduction, and environment and disaster education. The GCOE program of Kyoto University targets education and research excellence on Human Security Engineering in Asian Megacities, with focus to city governance, infrastructure management, health risk management, and disaster risk management.

Metroplanado

The Metro Manila Planning and Development Officers' Association, Inc. or Metroplanado is a non-government organization (NGO) of City/Municipal Development Planning Officers from Metro Manila which was organized in 1991 to assist the local government units of the National Capital Region (NCR) in the formulation of the general master plan for the metropolis. The Association aims to establish, promote, and institutionalize planning as an effective mechanism for an organized, systematic, and well-planned urban development process. Metroplanado has 17 members wherein sixteen are cities (Caloocan, Las Piñas, Makati, Malabon, Mandaluyong, Manila, Marikina, Muntinlupa, Navotas, Parañaque, Pasay, Pasig, Quezon City, San Juan, Taguig, and Valenzuela) and one is a municipality (Pateros).

International Environment and
Disaster Management Laboratory
Graduate School of Global Environmental Studies
KYOTO UNIVERSITY
Yoshida Honmachi, Sakyo-ku, Kyoto 606-8501, JAPAN
Telefax: +81-75-753-5708
E-mail: shaw@global.mbox.media.kyoto-u.ac.jp
Website: http://www.iedm.ges.kyoto-u.ac.jp/

METROPLANADO
c/o Urban Development Department,
5/F Old Makati City Hall, J.P. Rizal St., Poblacion,
Makati City 1200, Philippines
(+63-2) 870-1738 to 39
(+63-2) 899-8958
metroplanado@yahoo.com

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