Estero Housing Project: Redefining the Concept of Affordable Shelter

Gloria B. Teodoro, FUAP, PIEP, MS and Albert S. Zambrano, UAP, MA, URP
Mapua University
Intramuros, Manila
gbteodoro@mapua.edu.ph

ABSTRACT

The full awareness of climate change raised the possibility of entirely new city models and housing typologies (Lehman, 2011). To guide urban designers and decision-makers, Steffen Lehmann introduced the 15 principles of Green Urbanism. But the difficult tasks of addressing climate change issues in cities have been made all the more challenging by rapid urbanization and the increase in the number of densely populated informal settlements in developing countries. The marginalized sector is often the most severely affected by natural disasters largely because of the poor location and lack of physical planning of their communities. Many of the old cities in the Philippines developed with little consideration for the geophysical and hydro-meteorological hazards of their settlement sites and therefore were not able to avoid or mitigate the potential risks brought about by natural calamities. The challenge of green development is more difficult in these poor communities. This paper discusses the issues and challenges in developing a green settlement for informal settlers along the esteros of Manila.

KEYWORDS *socialized housing, green urbanism, informal settlements, human settlements, Manila*

Debates on theory of ecological cities emerged more than 35 years ago and developed as a relevant research field concerning the future of urbanism and the cities. But even as early as 1902, Ebenezer Howard has written about green urbanism in his book entitled Garden City of Tomorrow. Some other early significant writings on green urbanism have come from noted planners such as Lewis Mumford and Jane Jacobs. Through the years, various authors reconnected urbanism with climatic condition that *"the field of sustainable city theories and climate responsive urbanism has constantly been expanded"* (Lehmann, 2011).

The 21st century, however, ushers in 'a new era of uncertainty,' where energy, water and food supply are critical. 'We live in a world of increasingly non-calculable uncertainty that we create with the same speed of its technological developments' (Beck, 2000). More recent theories for 'Compact Cities' (Burton, 1997) and 'Solar Cities' (Jenks and Burgess, 2000; Lehmann, 2011) encapsulate the visions based on the belief that urban revitalization and the future of the city can only be achieved through 're-compacting' and using clearly formulated sustainable urban design principles(Lehmann, 2011). These principles for achieving green urbanism have to be clearly defined and adjusted to an era of rapid urbanization, especially in the Asia-Pacific Region.

In 2000, the term 'Climate Change' has been widely introduced. The Green Urbanism theory for the 21st century, which aims to transform existing cities from fragmentation to compaction, started to emerge. Eco-city theory focuses on adjusting the relationship between city and nature. Leading sociologists and urban theorists began to explore wider areas such as globalization, urban sustainability, ecology, network systems, information and communication technologies, and other related fields (Lehmann, 2011).

'Sustainability Science' has emerged as a conceptual and theoretical basis for a new planning paradigm (Lehmann, 2011). The full awareness of climate change raised the possibility of entirely new city models and typologies that are likely to emerge: Green Urbanism. Cities can and must become the most environmentally-friendly model for inhabiting our earth. It is more important than ever to re-conceptualize existing cities and their systems of infrastructure, to be compact, mixed-use and polycentric cities.

The difficult tasks of addressing climate change issues in cities have been made all the more challenging by rapid urbanization and the increase in the number

of densely populated informal settlements in developing countries. The marginalized sector is often the most severely affected by natural disasters largely because of the poor location and lack of physical planning of their communities. Many areas in the Philippines, whether urban or rural, are known to be vulnerable to natural hazards such as typhoons, floods, landslides, volcanoes, earthquakes, and tsunamis. Many of the old cities in the Philippines developed with little consideration for the geophysical and hydro-meteorological hazards of their settlement sites and therefore were not able to avoid or mitigate the potential risks brought about by natural calamities. The challenge of green development is more difficult in these poor communities. This paper discusses the issues and challenges in developing a green settlement for informal settlers along the *esteros* of Manila.

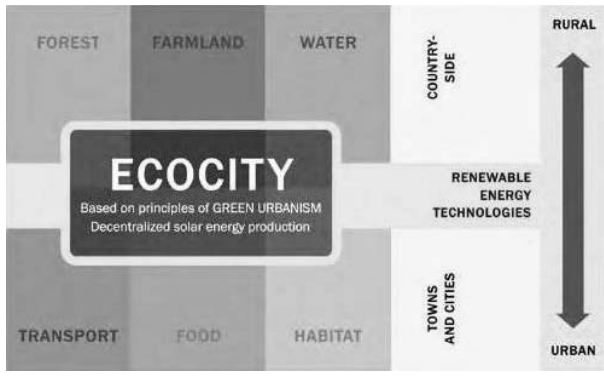
Green Urbanism

Green Urbanism, according to Steffen Lehmann in his book, *The Principles of Green Urbanism: Transforming the City from Sustainability*, makes every effort to minimize the use of energy, water and materials at each stage of the city's or district's life-cycle, including the embodied energy in the extraction and transportation of materials, their fabrication, their assembly into the buildings and, ultimately, the ease and value of their recycling when an individual building's life is over. It requires the collaboration of landscape architects, engineers, urban planners, ecologists, transport planners, physicists, psychologists, sociologists, economists and other specialists, in addition to architects and urban designers. Today, urban design also has to take into consideration the use of energy in the district's or building's maintenance and changes in its use. The following diagrams identify the inter-connectedness of issues impacting on urban development decisions. (Figures 1 & 2).

Figure 1. *The three pillars of Green Urbanism, and the interaction between these pillars.*
Diagram by: Steffen Lehmann



Figure 2. *The holistic concept of Eco-City has again a balanced relationship between the urban (city) and the rural (countryside).*
Diagram by: Steffen Lehmann



To achieve more sustainable cities, urban designers must understand and apply the core principles of Green Urbanism in a systematic and adapted way. These principles can be effective in a wide variety of urban situations, but they almost always need to be adapted to the context and the project's scale, to the site's constraints and opportunities. It is an approach to urban design that requires an optimization process and a solid understanding of the development's wider context and its many dimensions before the designer can produce an effective outcome. But a key component in any society's sustainability is more than its carbon footprint but of holistic social sustainability and identifying principles for healthy communities.

Lehmann also expounded on criteria for districts and cities where the Principles of Green Urbanism have been applied and integrated in every aspect of the urban environments. It is clear that the focus should be on the neighborhood and district scale, with projects on urban infill or redevelopment sites, adjacent to existing developed areas and transport nodes.

The 15 Guiding Principles of Green Urbanism

Lehmann (2011) further enumerated the 15 guiding principles of Urbanism (Table 1). According to him, in order to enable sustainable urban development and to ensure that ecodistricts are successful on many levels, all urban design components need to work interactively and cannot be looked at separately. The principles are based on the triple-zero frame of: zero fossil-fuel energy use, zero waste, zero emissions (aiming for low-to-no-carbon emissions).

"Zero waste" means that buildings are fully demountable and fully recyclable at the end of their life-cycle, so that the site can return to being a greenfield site after use.

Table 1: *15 Guiding Principles of Green Urbanism*
Based on: Lehman, 2011

Principle 1: Climate and Context	Based on climatic condition prior to selected city, every sustainable design project needs to maintain a complexity within biodiversity, eco-system or neighborhood layout. Enhance the opportunities offered by topographies and natural settings and use of the buildings' envelope to filter temperature, humidity, light, wind and noise.
Principle 2: Renewable Energy for Zero CO2 Emissions	Transform city districts into local power stations of renewable energy sources including solar PV, solar thermal, wind on-and-off-shore, biomass, geothermal power, mini-hydro energy and other new technologies. Some most promising technologies are in building – integrated PV, urban wind turbines, micro CHP and solar cooling.
Principle 3: Zero Waste City	Waste prevention is way better than the treatment or cleaning-up after waste is formed. So cities should adopt zero-waste urban planning in line with the manufacturing of metals, glass, plastics, paper into new products and better understanding of nutrient flows is needed to control global nitrogen cycle.
Principle 4: Water	Cities can be used as a water catchment area by educating the inhabitants in water efficiency, promoting rainwater collection and using waste water recycling and storm water harvesting techniques. In terms of food yielding level, less water needed and drought resistant crops can be developed.
Principle 5: Landscape, Gardens and Biodiversity	Introduce inner-city gardens, urban farming/agriculture and green roofs to maximize the resilience of the eco-system through urban landscape thus to mitigate UHI effect. Plants can be used for air-purification and narrowing of roads for urban cooling. Moreover, preserving green space, gardens and farmland, maintaining a green belt around the city is necessity to absorb CO2.
Principle 6: Sustainable Transport and Good Public Space: Compact and Poly-Centric Cities	An integration of non-motorized transport, such as, cycling or walking and bi-cycle or pedestrian-friendly environment with safe bicycle ways, eco-mobility concepts and smart infrastructure that is electric vehicles, integrated transport system of bus transit, railway and bike stations, improved public space networks and connectivity and a focus on transport-oriented development (Green TODs).
Principle 7: Local and Sustainable Materials with Less Embodied Energy	City construction by using regional, local materials with less embodied energy and applying prefabricated modular systems.
Principle 8: Density and Retrofitting of Existing Districts	The city is with retrofitted districts, urban infill, and densification/ intensification strategies for existing neighborhoods.
Principle 9: Green Buildings and Districts, Using Passive Design Principles	The city, here, applies deep green building design strategies and offers solar access for all new buildings.
Principle 10: Liveability, Healthy Communities and Mixed-Use Programs	The prime concern of the city is for affordable housing, mixed-use programs and a healthy community.
Principle 11: Local Food and Short Supply Chains	High food security and urban agriculture by introducing 'eat local' and 'slow food' initiatives.
Principle 12: Cultural Heritage, Identity and Sense of Place	A sustainable city with high air quality, no pollution for good health, fosters resilient communities having public space networks and modern community facilities.
Principle 13: Urban Governance, Leadership and Best Practices	The city applies best practice for good urban governance through combined management and governance approaches and sustainable procurement methods, such as, environmental budgeting.
Principle 14: Education, Research and Knowledge	The city with education includes technical training and up-skilling, research, exchange of experiences and knowledge dissemination for all in sustainable urban development.
Principle 15: Strategies for cities in developing countries	Particular sustainability strategies are needed for cities in developing countries, such as, train local people to empower communities, creating new jobs and diversifying new job structures to harmonize the impacts of rapid urbanization and globalization.

The Housing Situation

The Philippines has a rapidly increasing urbanization, today almost 60% of the population live in urban areas. The annual rate of urbanization has been 5% from the 1960's and slowed down to around 3% in the mid-90's. This matches the rate of urbanization in East Asia, although the Philippines has not experienced the same level of economic development that usually follows increased urbanization (The World Bank, 2002).

The level of urbanization can be explained with a high national birth rate, which is higher in urban areas and with the migration from rural areas to urban that occurs when people move into the cities from the countryside in search of better opportunities. The rapid urbanization presents several problems as land becomes scarce and more expensive and the rate of urban development does not match the growth of the population. The government aims at providing 1.2 million new households although there would still be a need for 3.3 million additional housing units (Philippine-Canada Local Government Support Program). (Table 2)

Table 2: *Housing Backlog, 2007 – 2016*
Source: HUDCC

Components of Housing Needs	Initial Needs (As of Jan 1, 2007)	Incremental Needs										Total Housing Needs CY 2007-2010
		CY2007	CY2008	CY2009	CY2010	CY2011	CY2012	CY2013	CY2014	CY2015	CY2016	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Total Housing Needs	1,273,395	572,388	584,067	595,981	608,141	620,548	633,209	646,128	659,306	672,763	686,484	3,633,972
A. Accumulated Needs	1,273,395	25,981	26,507	27,051	27,603	28,165	28,740	29,326	29,925	30,535	31,158	1,380,537
1. HH in Unacceptable Housing	859,310	17,532	17,888	18,254	18,627	19,006	19,394	19,790	20,194	20,606	21,026	931,611
a. Homeless	11,937	244	248	254	259	264	269	275	281	286	292	12,942
b. Dilapidated/condemned	134,931	2,753	2,809	2,866	2,925	2,984	3,045	3,107	3,171	3,236	3,302	146,284
c. Marginal Housing (including informal settlers)	712,442	14,535	14,831	15,134	15,443	15,758	16,080	16,408	16,742	17,084	17,432	772,385
2. Doubled-up HH in Acceptable HU	414,085	8,499	8,619	8,797	8,976	9,159	9,346	9,536	9,731	9,930	10,132	448,926
B. Future/Recurrent Needs		546,407	557,560	568,930	580,538	592,383	604,470	616,801	629,381	642,228	655,326	2,253,435
1. Allowance for Inventory losses		215,958	220,364	224,859	229,447	234,128	238,905	243,779	248,752	253,827	259,006	890,628
2. Increase in HHs (likely to afford to own acceptable HU)		330,449	337,196	344,071	351,091	358,255	365,565	373,023	380,629	388,401	396,320	1,362,807

The emergent need for housing has produced large amounts of "spontaneous settlements" or slums. Slum areas are typically low-rise buildings and the tradition of landownership results in very small lot sizes, packed together tightly with small and irregular pathways between. Since slums develop without any official planning, basic services like electricity, water and sanitation is lacking. They are also more prone to fires due to the poor construction and fire apparatuses and rescue vehicles usually have a hard time entering. Although slums can be found in forgotten or unused areas of the city, many slums often develop on unsuitable and hazardous sites. It might be along esteros, railways or motorways, on dumpsites or in areas prone to natural disasters such as landslides and floods.

Housing Policies and Actors

According to the 1976 United Nations Conference on Human Settlements, housing is a basic human right. United Nations Millennium Development Goals (MDG) aims to "achieve significant improvement in lives of at least 100 million slum dwellers, by 2020. In the Philippines, this obligation of the government to provide housing is enshrined in Section 9 Article VIII of the 1987 Philippine Constitution.

The earliest method of solving the issues with squatters was simply to evict them and relocate them to resettlement sites. The resettlement was problematic as the sites often lacked basic facilities and infrastructure and the distance to their workplace grew. The legal framework of urban land reform and the provision of decent housing for the urban poor began with the Urban Land Reform Act of 1978 or Presidential Decree No. 1517. The first programs for on-site development took place. Slum upgrading has the benefit that people do not have to move to new areas. But the government was criticized for failing to benefit the poorest of the poor. Working with limited budget and inept housing agencies, the government can barely address the housing backlog.

Republic Act 7160, or the Local Government Code of 1991, has strengthened the role of the LGUs in housing. It mandated the LGUs to put up low cost and mass housing for their inhabitants (Section 17). Another landmark bill, Republic Act 7279 or the Urban Development and Housing Act (UDHA), was signed into law in 1992. RA 7279 laid down the policies and mechanisms for the implementation of a comprehensive urban development and housing program for the country. During Pres. Corazon Aquino administration, the government adapted the United Nations Global Shelter Strategy (GSS 2000) with the standing point that shelter needs to be affordable even for the lowest income group.

The Housing and Urban Development Coordination Council (HUDCC) was established to synchronize the housing efforts. Focus shifted to socialized housing and a number of adjustments was made on how to address the housing problem, including beneficiary participation and the involvement of NGOs (Rebullida and Endriga, 1999).Relocations are still used when the site is clearly unsuitable or if it is not possible to acquire legal rights to it. But other solutions such as re-blocking and slum upgrading are being used, where the squatters acquire the legal rights to stay where they are and the necessary adjustments are made to provide descent infrastructure and shelter.

The HUDCC is the "highest policy making body for housing and coordinate the activities of the government housing agencies to ensure the accomplishment of the National Shelter Program". It is coordinating the efforts of 4 shelter agencies, 3 funding agencies, 7 government support agencies and 2 private sector representatives from NGOs and private developers (www.hudcc.gov.ph).

In 2002, another move by the national government was geared towards the improvement of an LGU's thrust in Housing. On 13 September 2002, President Gloria Arroyo issued Memorandum #74, Section 5 of which provides that *"The LGUs without local housing boards shall create their respective*

housing boards, or their equivalent, within 30 days from effectivity of this Order".

According to *Statistical Indicators on Philippine Development of 2006* the governmental housing sector has produced mixed results. The number of shelter security units produced has declined since 2004 as has the value of shelter security units constructed, financed and/or administered by the government. It is worth mentioning that licenses issued for residential units have been above the target for each year. Also the number of days required for processing loan applications has been reduced by half from 2004 to 2006, from 30 days to 15, which indicates that the process of acquiring improved housing has become smoother (www.nscb.gov.ph, 2008).

In response to climate change challenges, the Climate Change Act of 2009 was enacted last Oct. 23, 2009. The Republic Act 9729 promotes a gender-sensitive, pro-children and pro-poor perspective in all climate change and renewable energy efforts, plans and programs and shall strengthen, integrate, consolidate and institutionalize government initiatives to achieve coordination in the implementation of plans and programs to address climate change in the context of sustainable development. It shall also *"systematically integrate the concept of climate change in various phases of policy formulation, development plans, poverty reduction strategies and other development tools and techniques by all agencies and instrumentalities of the government."* This Act also established the Climate Change Commission and also ordered the formulation of a Framework Strategy on Climate Change and a National Climate Change Action Plan.

Table 3: *PNOY Fund number of housing units*
Source: NHA

DESCRIPTION	NO. OF UNITS
IN-CITY RESETTLEMENT	
A. NHA Properties	
1. Smokey Mountain Development Project, Manila	970
2. Tala 2, Caloocan	480
3. Camarin, Caloocan City	1200
4. Pleasant Hills, San Jose Del Monte City, Bulacan	1440
5. Gulayan, Navotas City	120
6. Tanglaw, Navotas City	60
7. MMDA Depot, Pasig City	120
8. NGC, Brgy. Holy Spirit, Quezon City	360
B. LGU Properties	
1. Disiplina, Valenzuela City	594
2. Tanza, Navotas City	680
3. Silverio Compound, Parañaque City	600
4. Las Piñas proposal with iHomes	710
5. Cobey Property, Mandaluyong City	68
6. NFS Property, Pasay City	200
C. CSO PROPOSALS	
1. King's Point, Brgy. Bagbag, Quezon City	1066
2. Brgy. Doña Imelda, Quezon City	450
3. Brgy. San Agustin, Novaliches, Quezon City	72
4. Brgy. Sto. Niño, Parañaque City	586
5. Estero de San Miguel, Manila	60
6. Tullahan River, Caloocan and Valenzuela Cities	1394
OFF-CITY RESETTLEMENT	
1. Maricaban, Tripa de Galina, Pasay	800
2. Manggahan, Pasig City	1000
3. Various sites of Quezon City	2361
4. Marikina City	830
5. Various sites of Manila City	300
6. Pateros	164
7. Parañaque City	1000
8. PPA, Isla Puting Bato, Manila	1000
9. Navotas City waterways	1000
10. Malabon City (typhoon Pedring victims)	700

Recognizing that climate change and disaster risk reduction are closely interrelated and effective disaster risk reduction will enhance climate change adaptive capacity, the Republic Act 10121 or the Philippine Disaster Risk Reduction and Management Act of 2010 was signed into law. The Act acknowledged that there was a need to "adopt a disaster risk reduction and management approach that is holistic, comprehensive, integrated, and proactive in lessening the socio-economic and environmental impacts of disasters including climate change, and promote the involvement and participation of all sectors and all stakeholders concerned, at all levels, especially the local community."

The National Disaster Coordinating Council (NDCC) was reorganized into the National Disaster Risk Reduction and Management Council (NDRMC), empowered with policy-making, coordination, integration, supervision, monitoring and evaluation. The Barangay Disaster Coordinating Councils were replaced by the existing barangay development councils which shall serve as Local Disaster Risk Reduction and Management Councils (LDRRMC) to ensure the integration of disaster risk reduction and climate change adaptation into local development plans, programs and budgets as a strategy in sustainable development and poverty reduction.

Former Pres. Benigno Aquino issued Memorandum Order No. 57 ordering the DILG to immediately lead the relocation of informal settlers living in danger and high-risk areas to decent housing sites. A Php 10-Billion called PNOY Fund was placed under the administration of the National Housing Authority (NHA) on November 23, 2011 through Special Allotment Release Order No. F-01836 for the relocation of informal settler-families (ISFs) in Metro Manila danger areas particularly along waterways (Table 3). The In-City Housing Program aims to address the housing needs of the ISFs, particularly in water ways, in compliance with the Supreme Court ruling to clean up the 3.0-meter easement of the Pasig River and its tributaries by 2015 under Memorandum Circular 2420 dated March 17, 2012.

Manila Informal Settlements

The City of Manila is the capital city of the Philippines, one of the 16 cities that make up Metro Manila, the National Capital Region. It is located on the eastern shore of Manila Bay and is bordered by the cities of Navotas and Caloocan to the north; Quezon City and San Juan to the

northeast; Mandaluyong to the east; Makati to the southeast, and Pasay to the south (Figure 3).The total population of 1,652,171 according to the 2010 census, inhabit an area of only 38.55 square kilometers, making Manila the most densely populated city in the world (Carbone, 2011).

Figure 3. *The City of Manila.*
Source: Google 2010



The City of Manila is the seat of the executive and judicial branches of the government. Manila is listed as a global city, containing many scientific and educational institutions, numerous sport facilities, and other culturally and historically significant venues.

In the 1700s, Manila was already the center of Spanish activity in the Far East and one end of the Manila-Acapulco Galleon trade route linking Europe, Latin America and Asia. Manila also saw the rise of the Philippine Revolution which was followed by the arrival of the Americans who made contributions to the city's urban planning and development only to have most of those improvements lost in the devastation of World War II (MCLUP, 2006).

During the Second World War, Manila was occupied by Japan using Intramuros as headquarters. The ensuing bombing for the Liberation of Manila from the Japanese resulted in the devastation of most of Manila and environs with the countryside still recovering from the aftermath of war, migrants in search of better work opportunities moved in to Manila. Since then the city has been rebuilt and has rapidly grown. Squatter settlements started to proliferate and expand as more migrants and natural population growth occurred, while the government pondered on how best to respond to the problem.

The City of Manila based on its City Charter (R.A. 409) covers a land area of 7,696.65 hectares. Administratively, the city is divided into six congressional districts. District IV is comprise of Sampaloc District. The Estero Housing Project is located in Barangay 412, in Zone 42 in Legarda, Sampaloc. The land use map indicates as university cluster zone (Figure 4).

The number of Informal Settlers as of July 2007 is 85,957 or 5.41% of Manila population of 1,581,082 (Figures 5, 6,&7).

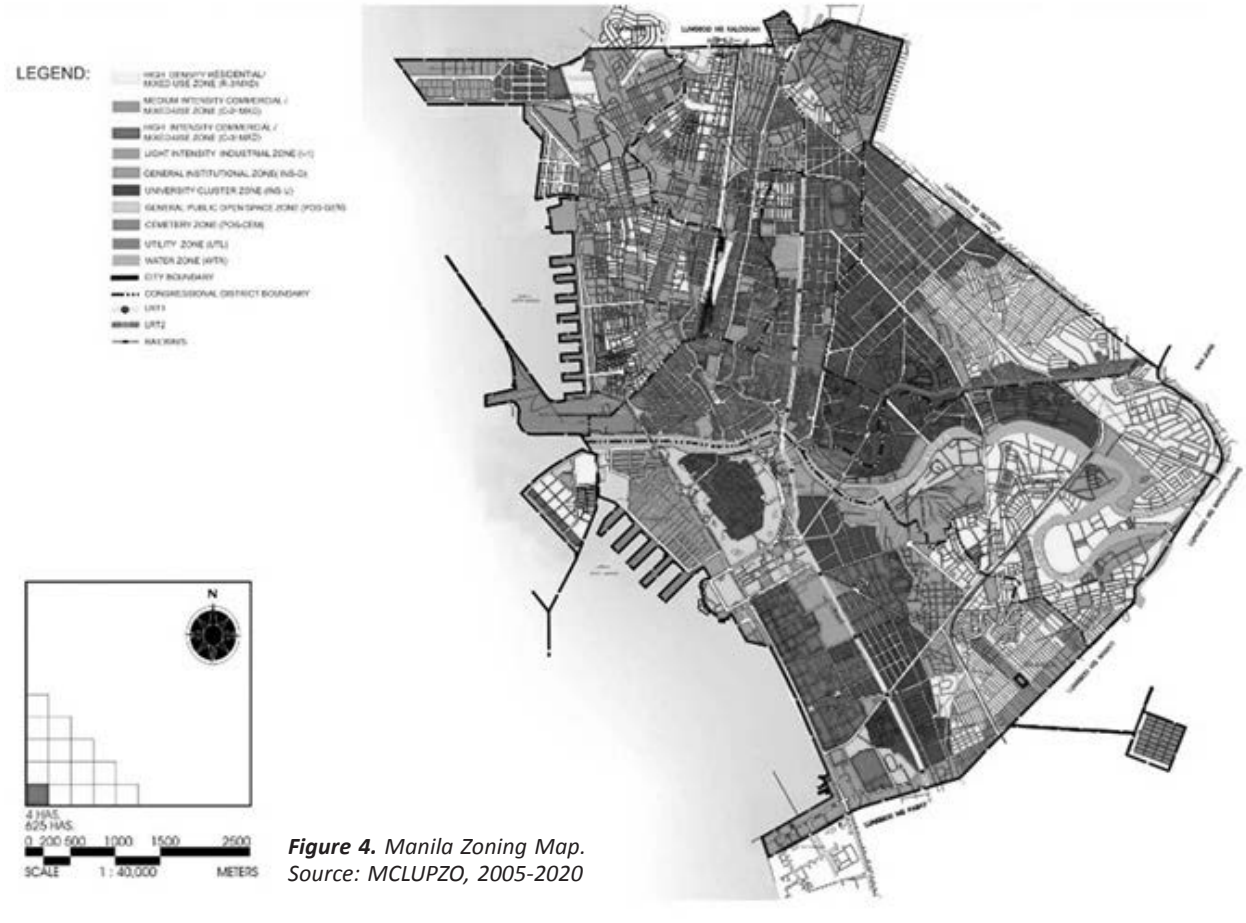


Figure 4. *Manila Zoning Map.*
Source: MCLUPZO, 2005-2020

Figure 5. *Informal Settlers Per District.*
Source: MCLUPZO, 2005-2020

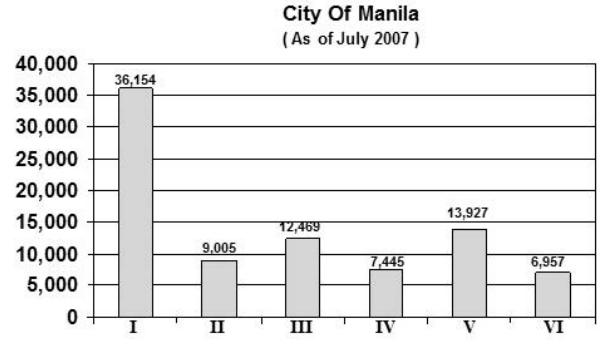
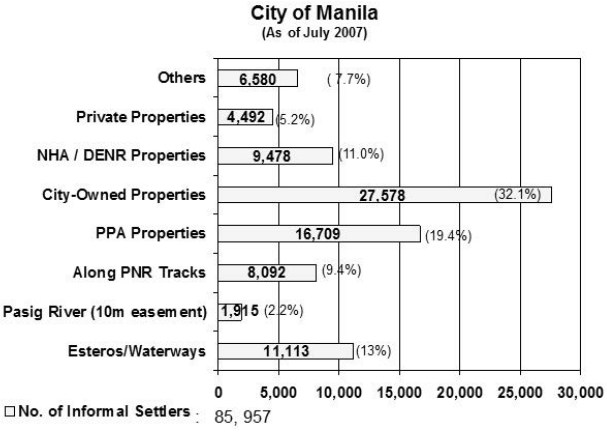


Figure 6. *Locations of Informal Settlers.*
Source: MCLUPZO, 2005-2020



Housing Development Programs

Housing, being an important component of urban development, is integrated in Manila's top sub-sector agenda for immediate implementation for the benefit of landless/homeless segment of Manila Society. Excerpts from the MCLUPZO relative to slum upgrading and informal settlements reveal that while upgrading is prioritized, the MCLUPZO explicitly states that other approaches may be employed other than upgrading in dealing with the slum problem (Table 4).

Table 4: *Sectoral housing plans of Manila on upgrading*
Source: MCLUPZO, 2005-2020

A. Emerging Issues and Concerns	*High susceptibility to destruction from disaster because of the condition of housing structures and materials*
B. Goals	*Upgrade and rehabilitate blighted areas, with provisions for basic services.*
C. Objectives	*To rehabilitate structures that are dilapidated, obsolete and unsanitary*
D. Strategies	*Prioritize in-city relocation and on-site development as much as possible, but relocate households in danger areas, ensuring that residents are still near their source of livelihood. On-site development refers to the process of upgrading and rehabilitation of blighted and slum urban areas with a view of minimizing displacement of dwellers in the said areas and with provisions for basic services.*
E. Plans and Programs	*On-site development of blighted areas – This involves the rehabilitation of structures that are dilapidated, obsolete and unsanitary, tending to depreciate the land value and to prevent normal use and development of the area. The first step in on-site development is to identify such blighted areas and map them. Settlers in danger zones will have to be resettled according to UDHA guidelines. The areas for on-site are prioritized according to their need for development guidelines (sic). The areas for on-site are prioritized according to their need for development. Like the construction of new shelter, on-site development will be more effective with the participation and involvement of the legitimate settlers themselves. A good incentive for their involvement in rehabilitating their own dwelling is security of tenure (that is, the residents will be more willing to collaborate with the government if they are assured that they will not be relocated at random or without due process). The Urban Settlements Office will work with the National Housing Authority in its on-site development programs.*

There are other legal bases for the Housing program of Manila. R.A 409 (June 18, 1949) authorizes the City to acquire land for sale on easy terms to qualified Manila residents. MMC Executive Order 81-03 (June 8, 1981) also created Urban Settlements Office to administer Land-for-the-Landless Program of the City (LLP).

Land for the Landless Program

The Land-for-the-Landless Program (LLP) provides adequate housing assistance to qualified actual occupants of the area. As of 2008, there were a total of 86 Estates under LLP covering a total of 66.8 hectares. 99.24% or 66.37 hectares had been awarded already to 6,325 beneficiaries (Figures 8 & 9).

Socialized Housing Program

As of 2008, there were a total 3,421 Awardees of the Socialized Housing Program in eight locations within the city (Table 5).

Figure 8. *Number of Awardees of "Land for the Landless Program."*
Source: LLP

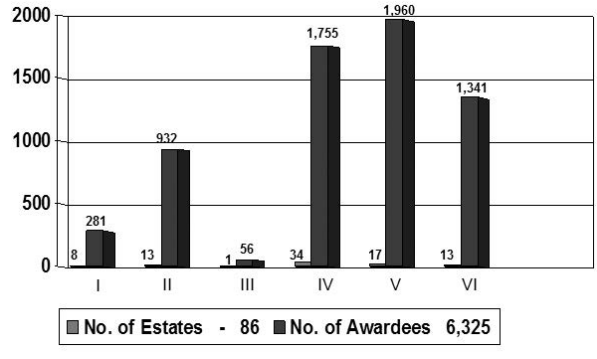


Figure 9. *Number of Awardees Under Land-for-The Landless Program Per District City of Manila, as of March 2008. Source: LLP*

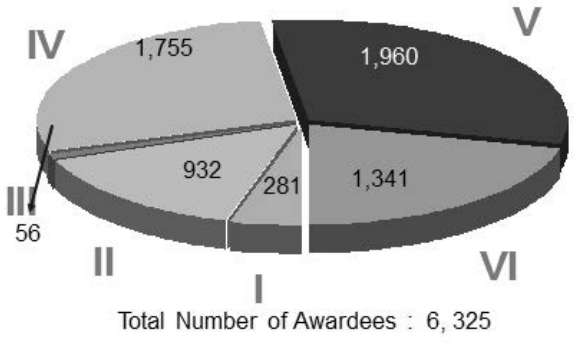


Table 5: *Number of Awardees of "Socialized Housing Program," 2007*
Source: NHA

Project	No. of awardees / units
Dagupan Medium Housing Project	93
U.N Gardens	366
Sambahayan sa Rawis	166
Sambahayan sa Moriones	142
Vitas Katuparan Condominium	200
Habitat for Humanity, BASECO Compound	1,000
Gawad Kalinga, BASECO Compound	956
Residencias de Manila, Jesus St. Pandacan	495

Land Acquisition

Under the land acquisition program, 58 estates or 3.29 hectares were under expropriation cases in court in 2007. This program is targeted to serve about 35,000 beneficiaries.

A survey was conducted on the beneficiary source sites of Anakbayan, Arroceros and Vito Cruz-Balagtas last December 2007 to determine the household income levels of the project beneficiaries. From the derived monthly household income data, the borrowing capacity of each income range was calculated based on the prevailing assumption that 20% of the monthly household income would be used to finance rental cost or housing loan amortization. The following borrowing capacity was derived (Table 6), showing the maximum loan amount a household can avail of based on its maximum monthly payment capacity.

Based on the borrowing capacity, several shelter packages were recommended in 2008 (Table 7).

Relocation of Informal Settlers in Coordination with Local Inter-Agency Committee (LIAC)

As of 2007, a total of 5,242 households were relocated coming from the following Informal Settlements: Estero de San Miguel, Estero de Balete, GMA Barangayan, Sta. Cruz, and PNR Rail Tracks (Table 8).

In 2008, 10,074 more families need to be relocated from 13 locations. Among these are 1,720 families that are to be affected by Slum upgrading.

For 2012, the MUPO identified more informal settlements to be relocated. In Tondo: Islang Puting Bato, Happy Land, Sitio Damayan, North Harbor, and R-10. Three bridge settlements: under Nagtahan Bridge in Sta. Mesa, under Delpan Bridge and under P. Casal Bridge in Brgy 385. Near three esteros: Estero de Valencia, Estero de Pandacan, and Estero de San Miguel. And in various areas in Manila: Punta Sta. Ana Tenement, Mindoro Street in Sampaloc, Almeda Street in Sta. Cruz, Barcelona Street in Binondo (Table 9).

Slum Upgrading

Based from the Strategic Plan of Manila in 2008, 10 areas were selected for slum upgrading in 2008 with over 1,700 displaced families (Table 10).

THE ESTERO HOUSING PROJECT: Barangay 412

The Estero Housing Project is located in Barangay 412, Legarda Street, Sampaloc, District IV of Manila with boundaries in the North by Lardizabal Street (Barangay 413), Manrique and Exterior Legarda Streets (Barangay 416) in the East, Interior Legarda Street (Barangay 638) in the South and M.F. Jocson and Exterior Legarda Streets (Barangay 410) in the West. It has a land area of 4,700 sq. m. Estero de San Miguel traverses the edge of the barangay in the south (Figures 10, 11, & 12).

Table 6: *Monthly Household Income and Borrowing Capacity (Php), MUPO 2008*
Source: Anakbayan, Arroceros and Vito Cruz-Balagtas

Decile	Household Income Range (Php)		Frequency	%	Monthly Payment[2]	Borrowing Capacity at 6%[3]	Borrowing Capacity at 8.67%[3]
					20.0%	20.0%	20.0%
1	0	5664	34	23%	566	94,404	72,471
2	5665	8154	34	23%	1,381	230,339	176,826
3	8155	10397	26	17%	1,855	309,398	237,517
4	10398	12950	17	11%	2,334	389,291	298,850
5	12951	15737	14	9%	2,868	478,358	367,224
6	15738	19705	12	8%	3,544	591,109	453,780
7	19706	26194	4	3%	4,590	765,573	587,712
8	26195	32689	4	3%	5,888	982,069	753,911
9	32690	49846	4	3%	8,253	1,376,531	1,056,730
10	49847	over	2	1%	9,969	1,662,745	1,276,450

Table 7: *Recommended Shelter Package based on Computed Loan Requirement / Income Level, MUPO 2008*

Income Level	MRB type	Size (sqm)	No. of units per MRB/ Condo	Unit Cost (PhP)	Open Space Allocation
1st decile (Below 6,000)	3-storey Atrium	22	36	150,000 to 200,000	30%
2nd decile (6 to 7,999)	5-storey Cluster Rowhouse (3-module)	25	60	180,000 to 230,000	50%
3rd decile (8 to 12,999)	"	"	"	250,000 to 300,000	50%
4th decile (13 to 18,999)	5-storey Cluster Rowhouse (2-module)	25	40	350,000 to 450,000	50%
5th decile (19,000 and above	Condominiums (MXD)	30 to 40	288 (resid'l)	700,000 to 1,000,000	As prescribed

Note: Product differentiation is in terms of unit features (loft provision), building location, quality of land development and open space area and amenities allocation

Table 8: *Number of households relocated*
Source: NHA

Site	No. of households relocated
Estero de San Miguel (Little Vietnam)	36
Estero de Balete	48
GMA Barangayan	101
Sta. Cruz, Manila	242
PNR Rail Tracks (North Rail South Rail Linkage Program)	5,000 (estimated)

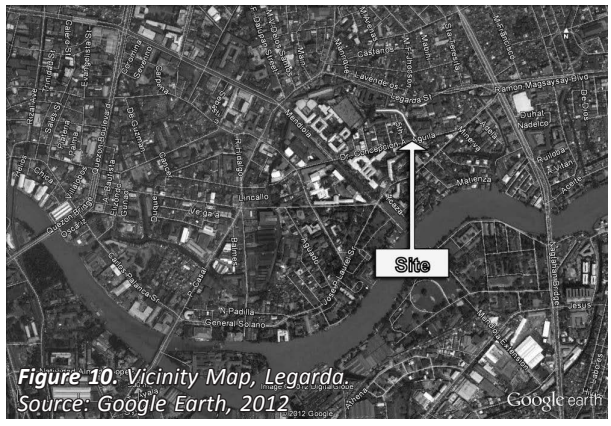


Figure 10. *Vicinity Map, Legarda.*
Source: Google Earth, 2012

Table 9: *Manila Informal Settlements, MUPO 2012*

Area / Location	No. of Censused ISFS	Relocated	For Relo-cation	Remarks
Islang Puting Bato, Tondo, Manila	930 (fire/flood victims)	352 (Montalban, Rizal, Baras)	578	- Lead Agency – NHA - Voluntary relocation activities on-going
Under Nagtahan Bridge, Sta. Mesa, Manila	116 (fire victims)	45 (Brgy. Gaya-Gaya, San Jose Del Monte, Bulacan	71	- Lead Agencies – DPWH, NHA
Happy Land Tondo	150 (flood victims)	59 (Baras, Rizal)	91	- Lead Agencies – NHA, MDSW - Voluntary relocation activities on-going
Sitio Damayan, Tondo	150 (flood victims)	-	150	- Lead Agencies – NHA, MDSW - Social preparations on-going
North Harbor, Tondo	768	-	768	- Lead Agencies – PPA, NHA - Social preparations on-going
R-10, Tondo, Manila	2 330	133 (Brgy. Gaya-Gaya, San Jose Del Monte, Bulacan)	2 197	- Lead Agencies – DPWH, NHA - Voluntary Relocation Activities on-going
Punta Sta. Ana Tenement, Sta. Ana, Manila	1 096	72 (Brgy. Gaya-Gaya San Jose Del Monte Bulacan)	1 019	- Lead Agency – NHA - Voluntary Relocation Activities on-going
Mindoro Street, Sampaloc, Manila	25	-	25	- Social preparations completed - Relocation Site for approval of NHA
Almeda Street, Sta. Cruz, Manila	170	-	170	- Social preparations completed - Relocation Site for approval of NHA
Barcelona Street, Binondo, Manila	40	-	40	- Social preparations on-going
Under delpan Bridge	41	-	41	- Lead Agency – PRRC Social preparations on-going
Estero de Valencia	281			- Lead Agency – PRRC Voluntary Relocation Activities on-going
Estero de Pandacan	1 226	181	1 045	- Lead Agencies – Kapit Bisig Para Sa Ilog Pasig, PRRC, MMDA - Voluntary relocation activities on-going
Estero de san Miguel, Bgy. 647 Casal St., Bgy. 385 under P. Casal Bridge	26 200	6	26 194	- For voluntary relocation on October 29, 2012 at Brgy. Gaya-Gaya, San Jose Del Monte, Bulacan

Figure 11. *Barangay Boundary, Barangay 412, Legarda.*
Source: Open Street, 2013

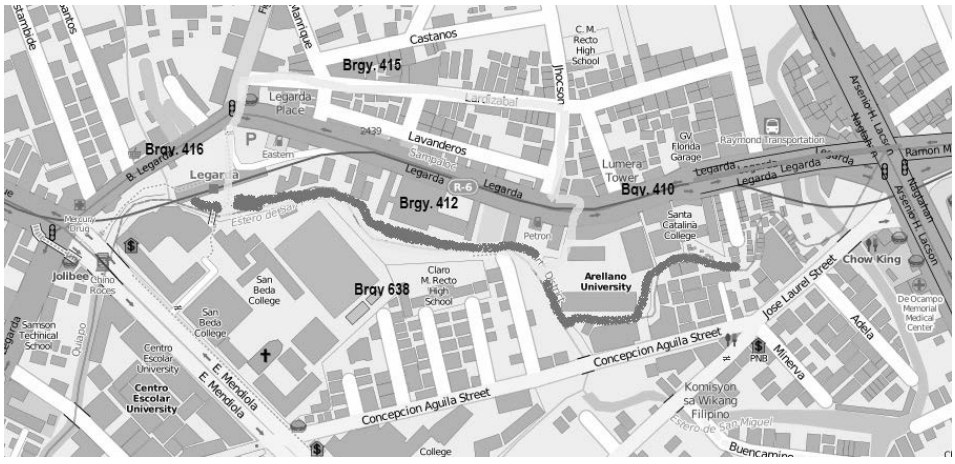


Figure 12. *Location Map.*
Based on: Google Earth

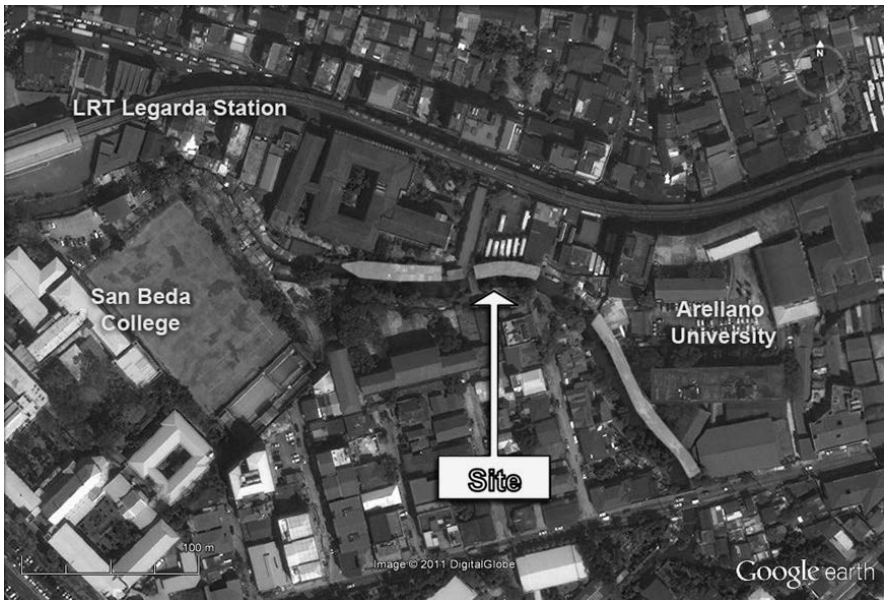


Table 10: *Estates for Slum Upgrading, MUPO 2008*

Estate	District	Exact Location	Lot Area (sqm)	Lot Owner (City of Manila)	Subd. Plan	Displaced Families (Estimated)
Ampil Gorospe	II	Juan Luna, Bulacan, Fernandez, Tondo, Manila	6,192.80	Ord. 4190 & 6880	YES	57
Samia I, II & III	II	J. Basa, Mercado, Nicodemus, Prudencio and G. Perfecto Sts. Tondo,	12,205.85	Ord. 5332	YES	249
Isla San Juan	II	Estero de Maypajo (Benita Ext)	4,563.40	Ord. 8003	NO	67
Amarlanhagui	I	Amarlanhagui, Baltazar, Tondo	890.70	Ord. 6521 and 7003	NO	14
Framaceda	I	Francisco-Esguerra-Dandan	4,842.00	Ord. 7704	NO	714
Torbuja	II	Abad Santos-F. Torres, Tondo	2,630	City Property	NO	51
Rita Legarda X & XI	IV	Felina St. Sampaloc, Mla	11,191.42	Ord. 79-1	YES	142
Alfonso Tuazon	IV	G. Tuazon, Loreto & Lacson St., Sampaloc,	27,809.30	Special Proclamation Augist 20, 1985	YES	235
Alfonso and Ramon Fabie	V	Zamora and P. Gomez Sts., Paco, Manila	10,794.50	Ord. 148	YES	85
Kaunlaran	VI	Estrada, Chromium, Sta. Ana	9,926	Res. 537-67	NO	33
Glori-Mart	VI	Tejeron, A. Francisco Sts., Sta. Ana	5,085.20	Ord. 6171	YES	73

In 2012, the estimated barangay population was 3,252,209 of which are children (1 to 6 years old), 98 are senior citizens and six are persons with disability, the most vulnerable to natural disasters. Their families comprise the lowest income earners and are 'poorest of the poor" having a monthly income of 5,000 to 10000 per month. They had been residing along the estero for 16 to 25 years already. Their usual source of income is vending (newspapers, sari-sari store, and balut). 78.9 % of the families owns their dwelling, 14.6 % are sharers of the housing unit while 6.4 % of them are renters.

With the exception of a few programs, notably the Department of Social Welfare and Development (DSWD) core shelter program, the community has hardly been touched by the government Shelter Program. Even the core shelter program is purely reactive and is activated only when the actual disaster is already facing the communities or as a postscript after the loss of lives, meager assets and makeshift hovels. These 160 families organized themselves to form "Nagkakaisang Mamamayan ng Legarda" and searched for a solution to their tenurial situation.

When Urban Poor Associates (UPA) workers came to link up with community leaders in 2009, they helped residents dialogue with mayors. Later the Legarda organization joined UPA, different groups around the country fighting for housing and other rights of landless people in cities – people living on land they have no legal right to.

The organization, with the help of UPA, identified a parcel of land created by accretion within the informal settlement as well as possible privately owned parcels of land near the area for those settlers that would not be accommodated in the site. Forty nine families were relocated in Bulacan. Through the intervention of Department of the Interior and Local Government (DILG) Secretary Mar Roxas, DSWD Secretary Dinky Soliman and Budget Secretary Butch Abad, the project was approved with funds to be sourced from an allocation above the first P10 billion committed by President Benigno C. Aquino for housing of ISF along waterways. DWSD was allowed to purchase a private land for settlers that would not be accommodated on site while Department of Environment and Natural Resources (DENR) has cleared the release of the accretion. Department of Public Works and Highways (DPWH) was appointed to implement the project as DSWD has no technical expertise on implementing housing projects.

Sustainable Concept of Affordable Housing

The Estero housing project is an urban mixed-use infill and transit oriented development; it is directly accessible by walking from Light Rail Transit (LRT) terminal in Legarda and combines residential and commercial uses to make goods and services accessible by foot or bicycle. This reduces transport demand and transport expenses of the poor.

The housing project was constructed through the People's Plan, a program which allows urban informal settlers to identify in-city relocation sites as an alternative to distant or off-city relocation. The model units in Estero de San Miguel will have six micro-Medium Rise Buildings (MRBs) on proclaimed land and could accommodate 16 informal settler families. Each building is very compact occupying a 24 sq. m lot and each structure can house two families in with approximately 18 sq. m unit each.

The plan respects the three-meter easement needed by the DPWH for access to the waterway and the design of the proposed structures takes cognizance of the flooding which occurs in the area.

The Micro-MRB is designed with the application of green building principles and concepts, such as natural light and ventilation, rain water harvesting, grey water re-use which can reduce electricity and water bills. Conventional MRBs cannot fit into the narrow available lot outside the three meter easement along the *estero*. The building also applied disaster resilient building features and principles to make it more resistant to fires, floods, strong winds, and earthquakes. The matt foundation is 1.5 meters deep to avoid liquefaction. The materials used are also complaint of the building code and it can withstand an intensity 7 earthquake.

Green walls are also incorporated, allowing residents to engage in urban farming to help achieve food security and reduce 'food miles' while improving the urban biodiversity and helping mitigate the urban heat island effect.

The Micro-MRB is three stories; the ground floor serves as flood buffer and may be used for income generating activities. The dwellings are located at the second and third floors. It maximizes the use of urban land, easier to construct thereby allowing small contractors to participate in the construction. Micro-MRBs are also easier to maintain, healthier, safer, more resistant to floods, more resistant to earthquakes and allows the dwellers to engage in income generating activities that would help lift the occupants out of poverty. (Figures 13 & 14a).

A material recovery facility and sewage treatment plant were also incorporated in the plan. This project clears the three meter easement of the *esteros*, create parks and open spaces, mitigate the effects of disasters and climate change. The development therefore allowed densification of the district but also created a vibrant sense of place in the otherwise blighted community.

The payment for the amortization of the housing is also flexible and depends on the capacity of the beneficiaries to pay. Under the "People's Proposal" that was approved by the DILG and DSWD, the payment for the amortization of the housing is

Figure 13. *Site Development Plan.*
Based on: Google Earth



Figure 14a. *Aerial Perspective.*



Figure 14b. *Exterior Perspective.*



flexible. The beneficiaries could pay 300 pesos or 500 pesos or even 1000 pesos per month depending on their income for 25 to 30 years.

The relocation of informal settlers from so-called danger zones and high risk areas to better, safer communities, will also pave the way for the clearing of clogged waterways that will help address the perennial flooding woes in Metro Manila. The first environment-friendly housing project was spearheaded by the DILG and the DSWD in partnership with the DPWH and DENR. (PIA-NCR/RJB/SDL). (See Figures 14b – 14f).

Economic Impact of the Estero Housing

The Micro-MRB design is linked with economic development. The construction methods and systems can be done by unskilled workers, providing job opportunities to those unskilled or have little skill in construction. The construction is still labor intensive, creating opportunities for jobs, it depends less on mechanized equipment that emits carbon dioxide in the atmosphere when operated. The building uses local materials at every opportunity, stimulating demand for local products.

Figure 14c. *Floor Plan.*

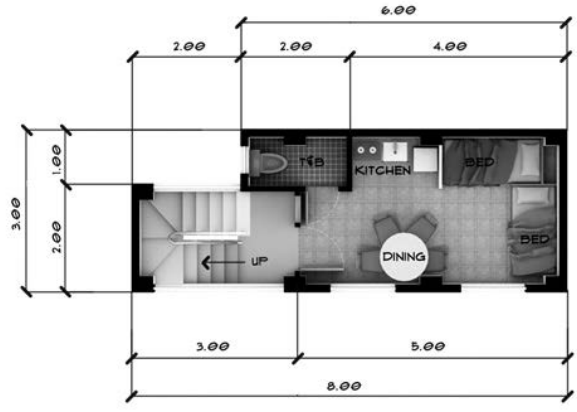


Figure 14d. *Interior Perspective.*



Figure 14e. *Building Section.*



Figure 14f. *Constructed Model Unit of the Estero Housing Project.*



The Micro-MRB can be built by small or informal contractors. This can spread the benefits of development by allowing such small contractors to participate in housing development that is usually monopolized by large contractors building large housing estates or large buildings. It creates opportunities for the poor to engage in micro-enterprises that will help them get out of poverty (Figure 15).

The construction of Micro-MRBs will have multiplier effects on the community itself, stimulating other Micro-Enterprises and eventually will have a positive effect on the local economy. Increase in income of the poor can also translate to increase in Government revenue. The poor, when their lives improve can afford to pay for goods and services of big business, thereby stimulating the general economy.

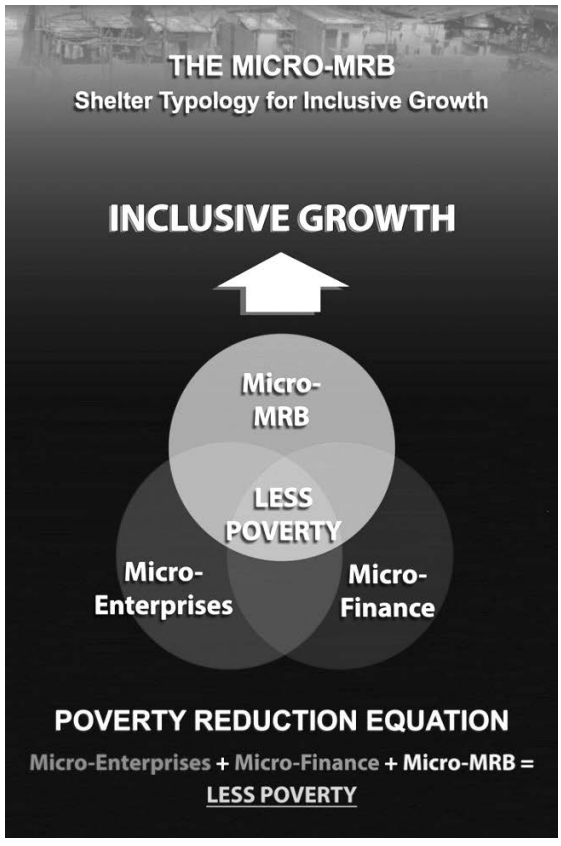
The project is set to be replicated in other esteros in Sampaloc and adjoining districts (Figures 16 and 17). The DILG has listed, as beneficiaries of the program, a total of 105 ISFs on Legarda Street and 260 ISFs on P. Casal Street, both along Estero de San Miguel; 149 ISFs in Estero de San Sebastian; and 63 in Estero de Quiapo.

Issues and Concerns

Pushing for on-site housing took a lot of hard work and people's organization according to the Alicia Murphy, UPA field director. The community was not prioritized in the LGU Housing program of the previous administration probably due to the level of risk that the community is exposed to and the number of the families involved which is relatively small compared to other settlements. Barangay 412 was neither prioritized for relocation nor for site improvement. For every change of local public officials, the community will have to start the lobbying to the new Mayor to avoid eviction.

It would be noted that DSWD and DILG are handling the Estero Housing Project with the assistance of DPWH, not NHA. It has been a struggle for the community to be recognized as qualified

Figure 15. *The Micro-MRB Model Concept for Inclusive Growth.*



beneficieries of NHA housing program due to the location of the settlement and due to the capacity of the residents to pay for monthly amortization. With the support of then DILG Secretary Robriedo and later Secretary Mar Roxas, the community was able to access budget for housing that was coursed through DSWD and DPWH when in fact,the housing program is under the mandate of HUDCC and NHA.

It has been more than two years since the release of 10 billion pesos PNOY fund but the implementation of projects (Table 3) is very slow. The Estero Housing Project which is not part of PNOY Fund took several years under the Aquino administration to realize the construction of the model unit. Part of the difficulty is getting the approval of DENR to allow building on accretion land. Despite the availability of funds, the community is finding it difficult to purchase land near the site to relocate the other ISFs. Alhough the projects had been bidded out, there are no more available relocation sites to ISFs who agreed to voluntary relocation.

There are also some concers with regards to architectural design and site planning. Due to narrow strip of land available, not all buildings of the project were laid-out and oriented in a way that keeps the buildings cool in summer. Because of narrow foot paths in some areas along the estero strip, there is difficulty of access of emergency vehicles. A series of fires had occurred in the area and families were affected each time as the fire truck could not get through. It is also difficult for dredging facilities to enter the area.

Recommendation

The impacts of climate change on land, energy, water, open spaces and on broader environmental aspects should be considered in urban planning. To reduce the severity of impact new planning policies should be in place to regulate the city growth, use of land, spatial distribution of uses, intensity of development on land, new developments on flood prone low land areas, developments on water bodies, use of natural resources and energy, and building materials and design through more resilient physical and institutional planning measures.

To achieve green urbanism, compact development should be promoted to reduce urban sprawl. This approach will protect low lands, water bodies and urban open green spaces and green belts. Provision of more parks and open spaces and creation of green belts around the city and green corridors are also necessary.

Provisions in building regulations to reduce the effect of hot weather should be implemented. This includes the use of natural ventilation, the buildings mass to moderate temperature, color and roof coating as cooling agent, provision of certain amount of greeneries and hard surfacing materials. Practical building guidelines should be adopted to include climate change issues in procedures of planning and design. Climate change impact assessment should also be required in securing development and building permits.

By practical planning guidelines on climate change issues, it is possible to meet the fresh water demand. To meet the growing need of fresh water, it is necessary to recover the increasing local storage of fresh surface water or rainwater. The national building code should be reviewed to include provision of rain water reservoirs and use of water saving appliances. Also, there is an urgent need for grey water recycling, drought resistant plants in landscaping, low flush water closets. Different water treatment processes are also needed to address increase in water salinity. Maintenance and operation of sluices and other regulators, groundwater management tools, land use management and density control techniques. Mandating the use of porous paving materials would also reduce the effect of flooding and shortage of ground water.

As Institutional adaptations, there should be cooperation among related organization on developing new design criteria and regulations on drainage and embankments capacity and their durability. To improve the run-off from land after heavy rain and storm surge, a well-maintained drainage network with high carrying capacity, appropriate embankments, water regulators and sluice gates are required in

Figure 16. *Proposed Locations of Estero Housing Projects. Source: Google Earth*

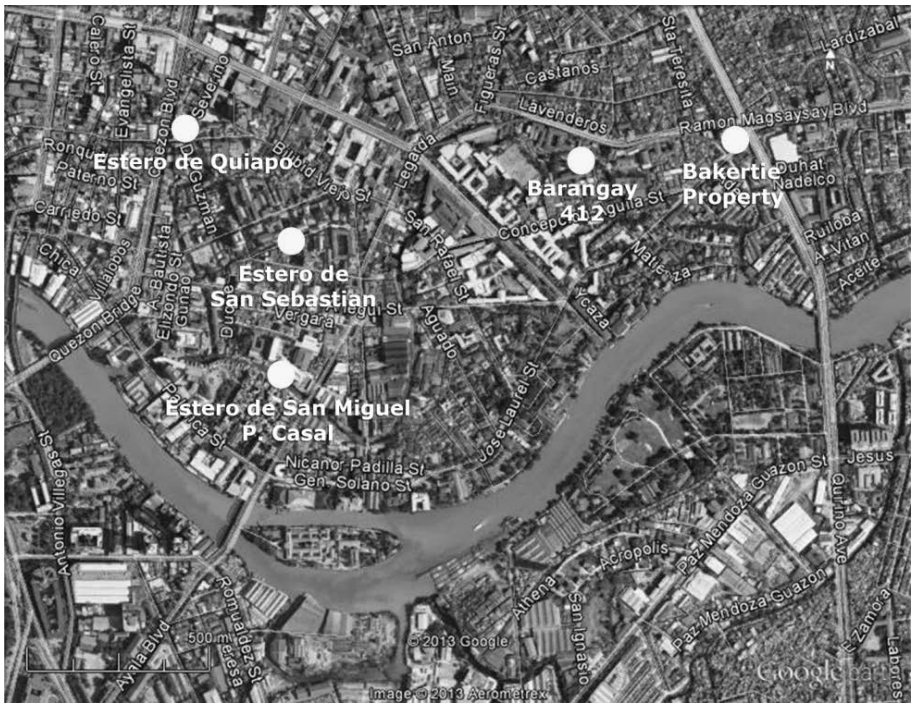


Figure 17. *Model of Estero Housing Project along Estero de San Miguelin P. Casal Street*



various locations in Manila.

Improvement of the Green Features

Due to limited budget, the structures are not self-sufficient energy producers. Although green passive design strategies and compact massing for reduced heat gain in summer were used,solar architecture concepts should be studied. Low lost solar lamps in the top floor and at the streets may be installed. More solar shading devices should be installed where necessary. The flow of water in the estero may be harnessed as renewable energy source as well. The use of white paint on the roof would also greatly reduce indoor temperature during sunny days.

The building components may be furthered studied to utilize more recycled materials. Although an MRF was identified, other strategies to eliminate the concept of waste such as composting should be implemented by the barangay,

The project used regional and local materials but refused to apply prefabricated modular construction systems to provide more local jobs. A study on the economic viability of prefabricated building components and comparative analysis of the carbon footprint reduction they offer in the long run should be conducted.

The use of multi-disciplinary approach, best practice for urban governance and sustainable procurement methods should be further explored by project proponents and the barangay officials.

Conclusion

There is now a growing interest in understanding the complex interactions and feedbacks between urbanization, material consumption, energy and water efficiency and the depletion of our resources. The question on how far urban form and population density impact on resource consumption is important but still not fully understood. The presented Principles of Green Urbanism are practical and holistic (Lehmann, 2011), offering an integrated framework, encompassing all the key aspects needed to establish sustainable development and encouraging best practice models. However, more research in these principles and their interconnectedness is necessary, to give better guidance for urban designers and decision-makers.

The Estero Housing Project clearly followed most of the green urbanism principles as it responds well to local climate, location, orientation and context, optimizing daylighting and passive cooling. As of now, the development is quiet, clean and effective and a healthy microclimate, despite the adjacency to *estero* due to weekly cleaning of the waterways by the barangay. But other areas could still be improved to eliminate the concept of waste, to further reduce or have no CO_2 emissions, and to apply new technologies

such as co-generation, solar energy, and prefabricated modular construction systems.

Designing a city requires holistic, multi dimensional approaches, and each time the adaptation of strategies to a unique context: the integration and combination of qualitative and quantitative knowledge is essential. The Estero Housing Project is a brave attempt to go beyond the usual relocation site for informal settlers that is more concerned in lowering the cost of development to make it affordable. The sustainability of the project remains to be seen but it is encouraging to note that even as the first class private developments are riding on the green urbanism movement, the government is likewise developing their counterpart in the most marginalized areas and sectors of the city. Slowly but surely, Green Urbanism will become the norm for all urban development projects even for on-site improvement of informal settlement such as those along Manila *esteros*.

References

Angel S. and Benjamin S. (October, 1974).“17 Reasons why the housing problem cannot be solved.”Impact, Urban Problems. Volume IX, No. 10.

Beck, U. (2000).Risk society: towards a new modernity. London: Sage.

Brundtland, G. H. (1987). “Our Common Future” (UN Report published).The Brundtland report. New York: Oxford University Press.

Carbone, N. (October 26, 2011).“The 10 Fastest-Growing Cities of Tomorrow."TIME.

Congress of the Philippines. (1991).Urban Development and Housing Act of 1992. Congress of the Philippines: Quezon City.

Congress of the Philippines. (2009).Climate Change Act of 2009. Congress of the Philippines: Quezon City.

Congress of the Philippines. (2010).Philippine Disaster Risk Reduction and Management Act of 2010. Congress of the Philippines: Quezon City.

Hardoy, J., Mitlin, D., and Satterthwaite, D. (2001). Environmental problems in an urbanizing world: finding solutions for cities in Africa, Asia and Latin America. London: Earthscan.

Herzog, T. (ed.). (1995/2007). The charter for solar energy in architecture and urban planning. Munich: Prestel.

Howard, E. (1898; reprint 1902/1989). Tomorrow, a peaceful path to real reform. Garden cities of tomorrow. London: ATC Books/Faber and Faber.

Jenks, M, and Burgess, R. (eds). (2000).Compact cities: sustainable urban forms for developing countries. London: Spon Press.

Laquian, A. (1969).Slums are for people: the barrio Magsaysay pilot project in urban community development. Local Government Center, College of Public Administration, University of the Philippines.

Laquian, A. (1983).Basic housing: policies for urban sites, services, and shelter in developing countries. International Development Research Centre: Canada.

Lehmann, S. (2010).The principles of green urbanism: transforming the city from sustainability. London: Earthscan.

Lehmann, S. (2011). “What is green urbanism?” Holistic principles to transform cities for sustainability, climate change - research and technology for adaptation and mitigation. Dr Juan Blanco (Ed.), ISBN: 978- 953-307-621-8, InTech.

Lehmann, S. and Crocker, R. (2011). Designing for zero waste. London: Earthscan.

Metro Manila Earthquake Impact Reduction Study (MMEIRS). (2004).

National Statistics Office of the Republic of the Philippines (NSO). (2010).Total population by province, city, municipality and barangay: as of May 1, 2010. Census of Population and Housing.

Santiago, A. (April,1983 / October, 1983). “Shelter and Services for the Poor: A Case Study of San Martin de Porres,” in Philippine Planning Journal. Vol. XIV, No. 2, Vol. XV, No.1.

Santiago, A.M. (1998). “Law and urban change: illegal settlements in the Philippines.” In Illegal cities: law and urban change in developing countries, Fernandes and Varley. New York: Zed Books.

Satterthwaite, D. (ed.). (1999).Reader in sustainable cities. London: Earthscan.

Satterthwaite, D. et. al. (2007).Adapting to climate change in urban areas: the possibilities and constraints in low- and middle-income nations. Human Settlements Discussion Paper Series Theme: Climate Change and Cities – 1. International Institute for Environment and Development.

Shimaoka, Y. (2006).Effects of on-site development to beneficiary households: a case study of the slum-upgrading program in Barangay San Antonio, Quezon City Philippines. Master’s Thesis in Urban and Regional Planning. The University of the Philippines, Diliman, Quezon City, Philippines.

Treberspurg, M. and Linz, S. (eds). (2008). SolarCity Linz-Pichling. Nachhaltigeb Stadtentwicklung / Sustainable Urban Development. Berlin: Springer-Verlag.

UN Habitat. (2003). The habitat agenda goals and principles, commitments and the global plan of action. Retrieved from http://www.unhabitat.org/downloads/docs/1176_6455_The_Habitat_Agenda.pdf

UN-Habitat (United Nations Human Settlements Programme). (2003).The challenge of slums: global report on human settlements 2003. London: Earthscan.

World Bank. (May, 2000). Cities without slums. Urban Notes, Thematic Group on Services to the Urban Poor. The World Bank, Washington, DC. Number 2.

Zambrano, A. S. (2006).An urban land use policy perspective in slum upgrading: the case of the hiyas ng Maynila. Master’s Thesis in Urban and Regional Planning. The University of the Philippines, Diliman, Quezon City, Philippines.