

Philippine Urban Infrastructure: Looking Back and Looking Forward

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ABSTRACT

Infrastructure consists of transportation, communications, water supply, wastewater treatment and disposal, drainage, solid wastes management, and energy. This short review focuses on urban infrastructure, its state, issues, and challenges in the megacities of the Philippines, namely, Metro Manila, Metro Cebu, and Metro Davao. In terms of transportation, the major cities have been experiencing worsening transport and traffic problems resulting in high rates of traffic accidents and air pollution. In communications, although the liberalization policy of communications allowed more players that provide all types of communication services, the country's communication, suffers from low internet speed, high infrastructure cost, outdated law, unsatisfactory service, and hackers. Problems for water supply include lack of water supply, high rates of non-revenue water, and increasing demand due to population growth and requirements of agriculture, business, and industrial establishments. Water-related problems are handling of wastewater, drainage, and flooding. On the other hand, solid wastes volume increases with increasing population and industrialization. Strategies to address the problems and challenges caused by rapid urbanization include institutional reforms to create multiple growth centers, improve public transport system and services so that many more people will use it, address the widening water supply/demand gap through water conservation, watershed management, rainwater harnessing, and expansion of the water supply system. To address the widening water supply/demand gap, water conservation, watershed management, rainwater harnessing, and expansion of the water supply system need to be careful, encompassing plan of action and implementation. Communications problems require expanding market liberalization, evaluating policy structures, review of licensing schemes among others. For solid waste management, the government's overall policy is shown in the National Solid Waste Management (NSWM) Framework with the key words: avoid, reduce, reuse, recycle, recover, treatment, and residues management.

Keywords:

urban
infrastructure,
transportation,
communications,
water supply,
waste
management,
Philippines

Citation:

Cal PC. 2016.
Philippine urban
infrastructure:
Looking back and
looking forward.
Transactions NAST
PHL 38(2):
doi.org/10.57043/
transnastphl.2016.
761

Plenary paper presented during the 38th Annual Scientific Meeting (July 2016) of the National Academy of Science and Technology Philippines.

INTRODUCTION

The roles of urban infrastructure to make urban areas livable, safe, and sustainable cannot be overemphasized. Infrastructure consists of transportation, communications, water supply, wastewater treatment and disposal, drainage, solid wastes management, and energy. Transportation enables the flow of persons, goods, and services, whereas communications make the flow of information and data possible. Water supply is a basic need but used water and the sources of water can cause flooding, if not also a threat to health. Solid wastes, as byproducts of living and economic activities, have to be properly handled.

This paper is based on the work that I did with the Development Academy of the Philippines as lead consultant for the physical infrastructure domain of the study, as well as a member of a JICA team that conducted the *Sustainable Urban Development for Metro Cebu study*.

This short review focuses on urban infrastructure as infrastructure is very broad. Energy is not included as there is a separate paper on it in this issue. This paper includes trends in population growth and urban metropolitan growth in the country as compared with neighboring countries, challenges and problems, and the strategies to address them.

IMPACTS OF URBANIZATION

By 2045, Philippine population is expected to reach 142 million according to the 2010 census-based population projections (PSA). Figure 1 shows population growth per capita GDP as well as the rate of urbanization. Since 1950, the rate of urbanization has been growing. In 1950, the proportion of those living in urban areas was about 28%, and this increased to 50% in 1990, and in 2015, to nearly 70%. These increases are apparent for Metro Cebu and Metro Manila from 2010 to 2015 as shown in Figure 2.

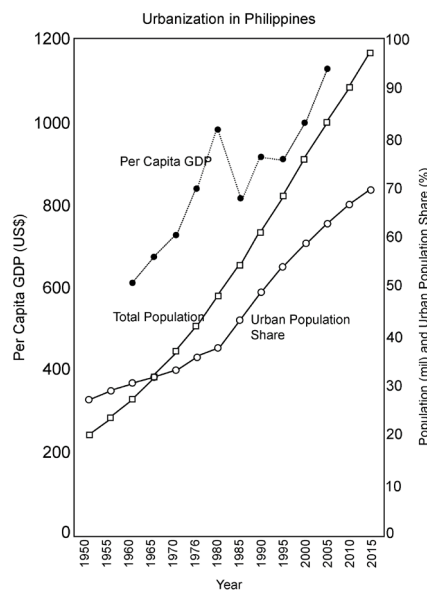


Figure 1. Total population, urban population, and per capita GDP, Philippines (1950-2015).

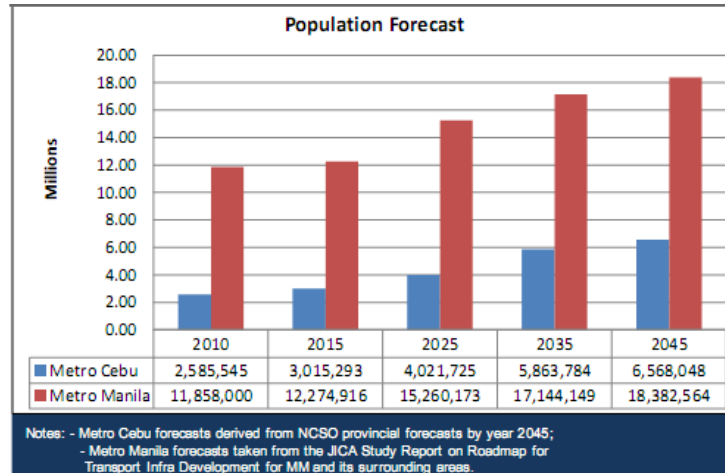


Figure 2. Population forecast for Metro Manila and Metro Cebu (2010-2045).

In the Philippines, the increasing urbanization is aggravated by the fact that the growth is really focused on Metro Manila (Figure 3). Metro Cebu is only 10% of Metro Manila. Thailand is as worse as Metro Manila in city size distribution. But Korea and Vietnam have several cities which are >30% than their largest cities, Seoul and Bangkok, respectively.

emergence of a hierarchy of public transport, virtually offering a door-to-door service. Unfortunately, the provision of transportation has not kept pace with rising travel demand, especially in large urban areas, resulting in traffic congestion and environmental deterioration. In fact, Congress is bent on granting emergency powers to President Rodrigo Roa Duterte to address transportation and traffic problems in Metro Manila and even other large urban areas.

Transportation

This rapid urbanization trend is putting a severe strain on urban infrastructure, particularly the transportation systems. Increasing travel demand has caused the

In a study we conducted for the World Bank in 2010, we reported the following: that medium to big cities were already



Figure 3. Urban growth in the Philippines, Thailand, Korea, and Vietnam.

experiencing worsening transport and traffic problems, light traffic congestion, low public transport level of service, high rate of traffic accidents, and air pollution in major cities especially here in Metro Manila. The resources for transport planning and traffic management were limited such as insufficient data for scientific analyses, budget mainly spent for personnel and little left for substantive measures. There was really no good institutional organizational setup to do transport planning and traffic management in 120 cities, and planning personnel lack transport planning and transport management capability. Since that time, we have been conducting training programs at the University of the Philippines and many local government personnel have attended these courses. At the National Center for Transportation Studies, we have a regular training program on traffic management and traffic impact assessment, and at the School of Urban and Regional Planning, we have a regular program called Short Course on Urban Transport (SCOUT).

Metro Manila is monocentric, just like the cities of Seoul, Tokyo, Shanghai, Jakarta,

and Bangkok, resulting in the convergence of travel to this center (Figure 4). This creates multiple problems. Unfortunately, our rail mass transit system is very limited in scope as compared to similar cities. While the daily passenger ridership in Metro Manila is less than a million, Seoul has 5.6 million ridership per day which shows how extensive its mass transit system is. Shanghai, with a population less than that of Metro Manila, has 3.5 million ridership per day. In terms of road network, Metro Manila is also at the bottom compared to the other neighboring cities.

Addressing the transportation problems

The strategies to address the transportation problems in the urban cities are as follows: (a) Improve public transport level of service. The theory is that the traffic congestion in Metro Manila is caused by the volume of cars on the road. Thus, to reduce congestion, the volume of cars traveling in Metro Manila has to be reduced. We, therefore, have to entice car users to move to public transport.

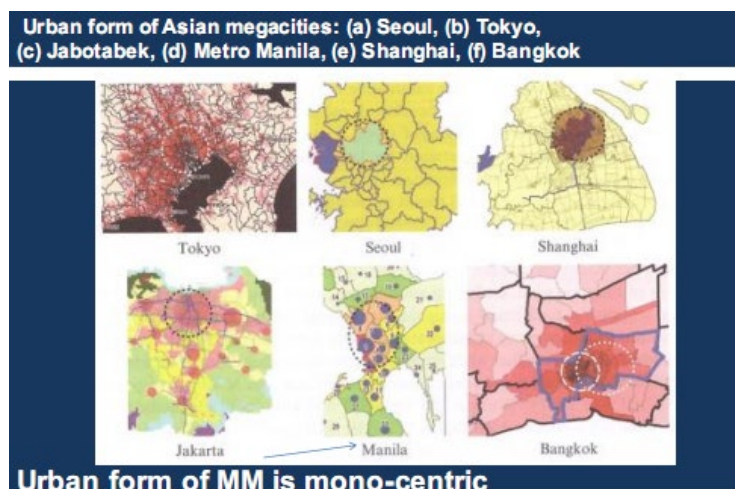


Figure 4. Urban form of Asian megacities: (a) Seoul, (b) Tokyo, (c) Shanghai, (d) Jakarta, (e) Manila, and (f) Bangkok.

- a. The first step is make public transport attractive to car users by improving the level of service.
- b. Expand the capacity of the rail mass transit system.
- c. Improve traffic management such as traffic signals, intersection control, and the like.
- d. Expand the road network to improve highway level of service.
- e. Improve land use planning.
- f. Pursue institutional reforms. For example, creating multiple growth centers is very important and this can be done only through institutional reforms. For example, Metro Manila has no authority in terms of approving major development proposals, or even approving the comprehensive land use plans of the cities under it. Thus, reforms are necessary.

Figure 6 shows the Proposed Greater Capital Region Spatial Structure which now includes, in addition to Metro Manila, growth centers in Bulacan, Cavite, Laguna, and these would disperse development. In terms of mass transit system, Figure 7 shows the network and how it would look like in 2030. The rail transit will be expanded. Presently, a JICA feasibility study is ongoing for a subway system (dotted red).

The highway network has to be expanded. This shows again, that by 2030, more expressways (green, proposed) and road network development should be done. This proposed development would entail an investment of PHP 2.8 trillion. Based on the consultants' forecast, these funds could be raised to implement the recommendations. In the case of Metro Cebu, for the same period up to 2030, an investment of PHP 240 billion pesos would be required to implement the proposal.

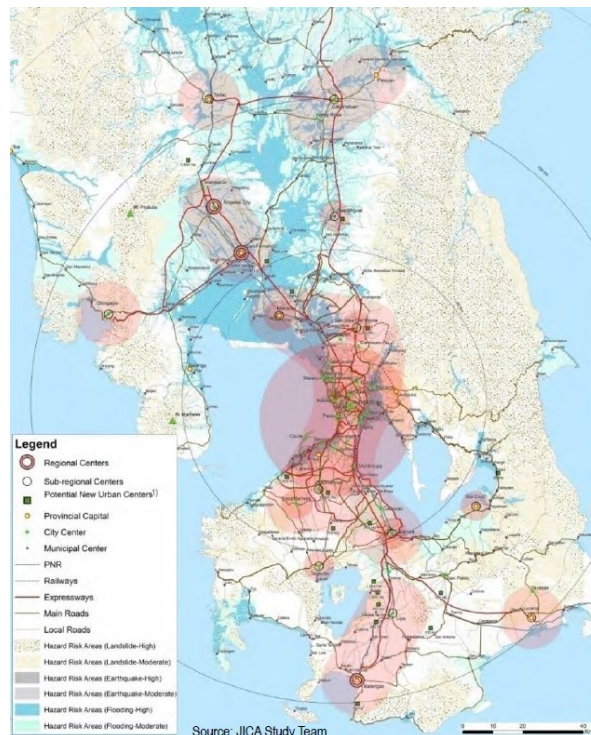


Figure 6. Proposed Greater Capital Region Spatial Structure.

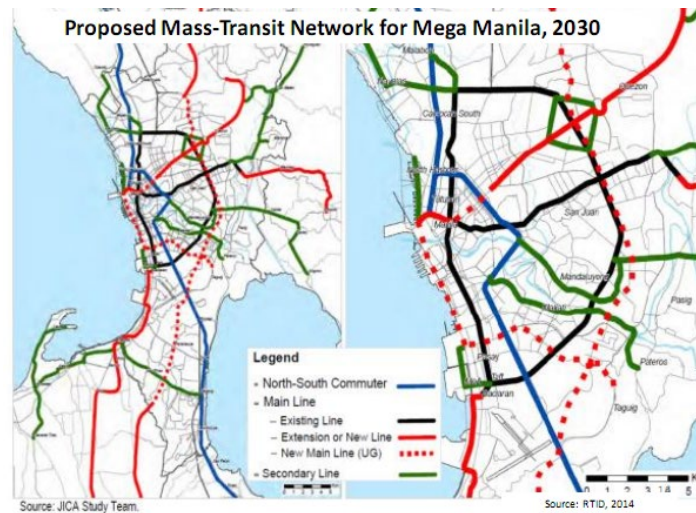


Figure 7. Proposed mass transit network for Mega Manila, 2030.

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Communications

In communications, the Philippines is enjoying the fruits of liberalization. There are about 3.14 million fixed telephone lines in service (2013 figure), with Metro Manila accounting for about 50% of the total. There are 36 million internet users, giving a penetration of 37%. The use of cellular mobile telecommunications is even more impressive.

The development of communications in the country, according to Oquindo and

Oquindo (n.d.), is traced to as early as in 1867, with the first telegraph link established between Manila and Corregidor. The first telephone system was inaugurated in 1890. In 1949, Globe wireless established ground-to-air radio telephone communications for airlines. This country's first cellular mobile telephone network was inaugurated by PLDT in 1988. The liberalization policy which took effect during the Ramos Administration allowed the entry of many players, providing all types of communication services. As per Buddecomm (2014), two million customers subscribed to dial-up service in 2014. However, demand is affected by slow broadband speed of only 3.4 Mbps in 2014, the lowest average in the ASEAN region. Mobile speed is likewise very slow at 3.8 Mbps. Postal services have been improved with the Philpost taking the lead, delivering about 147 million mails per year.

Thus, the problems confronting communications can be summarized as follows: slow internet speed, high infrastructure cost, outdated law, unsatisfactory service, and hackers.

What would be our proposal to address these issues? (a) Expand market liberalization, (b) consider open access approaches to infrastructure, (c) establish the National Broadband Network, (d) review licensing schemes, and (e) evaluate policy structures for spectrum.

Providing Adequate Water Supply

Water is a basic need. Yet the government is unable to meet adequately this need. Most cities experience lack of water supply. In the case of Metro Manila, Metro Cebu, and Davao City, the current demand is significantly higher than what their water districts can supply, in the face of abundant water resources in the country. The problem is aggravated by high rates of non-revenue water, reaching as high as 27.7% in the case of Davao City.

Demand for water is increasing due to population growth and the requirements of agriculture, business, and industrial establishments. Figure 8 shows the projected water demand in Metro Manila, Metro Cebu, and Davao up to 2045 (JICA 2015). For Metro Manila, water demand will

increase from its 2015 value of 1,955,280 cm/day to 2,114,672 cm/day in 2025 and 2,213,712 cm/day in 2045. For Davao City, the demand increase from 231,887cm/day in 2015 to 259,744 cm/day in 2025 and 500,829 cm/day in 2045. In contrast, available supply consists of 3,392,520 cm/day for Metro Manila, 188,082 cm/day for Metro Cebu and 21,726 cm/day for Davao City.

As shown, much is needed to address the widening demand/supply gaps, consisting of water conservation, watershed management, rainwater harnessing, and expansion of the water supply system.

Wastewater Handling

Associated with water use is the handling of wastewater in order to avoid endangering human health or the natural environment. The quality of wastewater is proportional to the amount of water consumed. Considering losses and usage of water for lawn, gardening, and irrigation, the amount of sewage flow is assumed to be around 70 to 90% of water consumption.

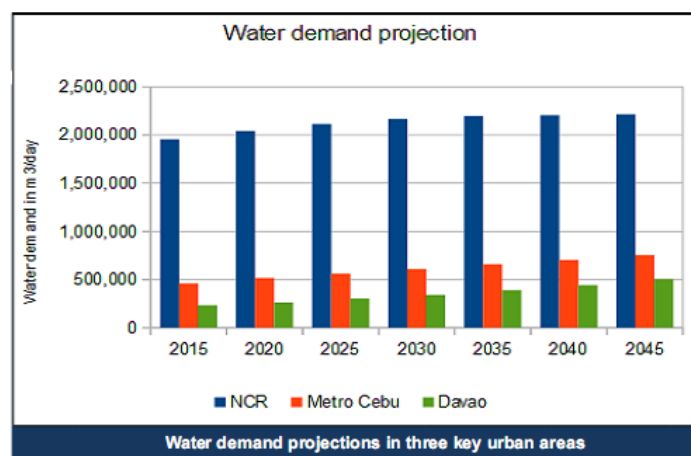


Figure 8. Projection of water demand in three megacities in the Philippines.

A centralized sewerage system is the best option of dealing with wastewater, but it is not realistic for most cities because of higher capital and maintenance cost and longer periods of construction. Therefore the use of septic tanks remains the most popular means for primary treatment. The septic tank system should be complemented with a septage management system for secondary treatment. In the case of Metro Cebu, an investment of PHP 98.8 billion is proposed for a secondary treatment composed of a septage treatment plant for the first year at PHP 1.2 billion and the rest for a sewerage system to year 2030.

Drainage and Flooding

Flooding in many regions and key cities has become evident in recent years, with increasing and unpredictable severity of rainfall. The latest incident was Yolanda which hit Northern Leyte, Eastern Samar, and the northern parts of Cebu and Antique which resulted in a death toll of 6,300 and damage to properties worth PHP 89 billion for Tacloban City alone. Causes of flooding include obstruction or contribution of waterways, construction within flood plains, encroachment within the river/creek easements, re-routing of channels/rivers, and clogging of drainage.

The solution to flooding consists of regulatory and engineering measures. Local legislation should include general policies on drainage systems, reforestation, and watershed management, protection of waterways, land use control, installation of cisterns in all types of development, and adoption of discharge fee principle. Of course, engineering improvements of the

system would be needed. In the case of Metro Cebu, PHP 8.43 billion would be required up to year 2030. The Drainage Master Plan of Cagayan de Oro would entail an investment of just under PHP 1 billion.

Managing Solid Wastes

A total of 39,422 tons per day (tpd) of solid wastes is generated in the country, with Metro Manila accounting for 8,907 tpd and Metro Cebu, 1,214 tpd. The average collection efficiency rate in urban areas is about 70% and for Metro Manila 83%. As of 2011, there were 643 open dumpsites, 384 controlled dump sites, 1,327 materials recovery facilities, and 38 sanitary landfills (EMB-DENR 2015).

The National Solid Wastes Management Council (NSWMC), NSWMC has forecast the volume of solid wastes that will be generated to year 2050. By 2022, Metro Manila would be generating 10,667 tpd, Metro Cebu 1,777 tpd, and Davao 1,377 tpd. In 2050, 27,944 tpd would be generated in Metro Manila, 4,656 tpd in Metro Cebu, and 3,784 tpd in Davao.

Both soft and hard measures are needed to deal with the solid wastes management problems. These are, in the decreasing order of priority: avoidance, reduce, reuse, and recycle (3R); recover, treatment; and residual management (Figure 9) (NSWMC 2004). It is forecast that more and more waste-to-energy technology would be adopted in the future to handle solid wastes. Investments on solid wastes management systems would be needed. In the case of Cebu, investment requirements to year 2050 would amount to PHP 2.747 billion, including a waste-to energy facility costing PHP 800 million.

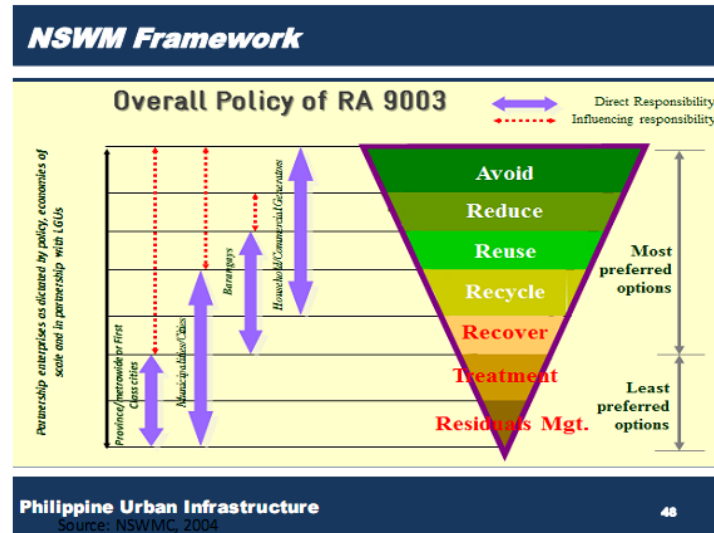


Figure 9. National Solid Waste Management Framework.

CONCLUDING REMARKS

The Philippines is an urbanizing country with about 70% of its population living in the urban centers in 2015. However, this paper shows the lack of urban planning and lack of investments needed to make living in the city worthwhile. As observed, transportation facilities are inadequate, domestic water supply cannot cope with the demand, and waste management has not been paid attention. There are available forecasts and investment estimates for provision of these services that just have to be recognized by our policy makers. Our cities need to be livable to be sustainable.

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