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Road and Rail Transport Infrastructure in the Philippines: Current State, Issues, and Challenges

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Abstract

This study assesses the state of the country's road and rail transport infrastructure, identifies issues and challenges in the implementation of the public road and rail transport infrastructure program, and generates policy insights based on the analysis. Quantity and quality indicators show that the Philippines continues to suffer from inadequate and poor-quality road and rail transport infrastructure. In most metrics of comparison with ASEAN neighbors, the Philippines is also behind in improving the quantity and quality of its road and rail transport infrastructure. The assessment of targets and achievements in the Philippine Development Plan, the Public Investment Program, and the expenditure program reveals that many of the targets were not met. The low absorptive capacity, as indicated in unmet expenditure targets, of the major agencies in charge of the road and rail transport sector suggests problems in implementation. Digging deeper into the implementation challenges, the study finds that the persistent problems are right-of-way acquisition, financing, political intervention, weak capacity at the local government level, natural calamities, and project management issues. There were also newly introduced problems, such as the adverse effects of the pandemic on the materials and manpower supply chain and the difficulty of implementing projects with delayed releases of funds. To help address these problems, the study offers policy insights. It would be ideal for Congress to enact a long-term national transport plan but in the meantime, strict adherence to the principles of the national transport policy issued by the executive branch can be adopted and the self-imposed mandate under that policy to craft a national transport master plan can be started. Capacity building programs for local government units must continue and the local roads databases, which are important in prioritizing areas for national government support, must be completed and integrated. To reduce political influence on project implementation, seeking reform champions is necessary and institutionalizing regional development councils' procedures can help.

Keywords: transport infrastructure, public investment program, road transport, rail transport, infrastructure quality

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Road and Rail Transport Infrastructure in the Philippines: Current State, Issues and Challenges

Adoracion M. Navarro and Jokkaz S. Latigar*

1. Introduction

The Philippine Development Plan (PDP) 2017-2022 assessed that despite previous investments on improvement and expansion projects, the transport infrastructure of the country is inadequate vis-a-vis the growing demand for transport infrastructure services (National Economic and Development Authority (NEDA) 2017). Moreover, the Updated PDP 2017-2022, which was released in February 2021 and takes into consideration the impacts of the coronavirus disease 2019 (COVID-19) pandemic, raised the challenge of resource mobilization and implementation of the transport infrastructure program amidst the pandemic and the transition to the "new normal" (NEDA 2021a). In the preparation of a new PDP for 2023-2028, the emphasis on transport infrastructure became prominent once again. Transport infrastructure is in fact highlighted in two strategies under the eight-point socioeconomic agenda for the next six years, to wit: (a) Reducing transport and logistics cost (under Agenda 1 - Protect purchasing power of families); and (b) Improving infrastructure (under Agenda 4 - Create more jobs). Planners and policymakers are therefore interested in assessing whether previous efforts have borne fruit and what challenges still lie ahead.

To check what progress the Philippines has made thus far and help the government uncover the issues and challenges in the transport sector, the PIDS is conducting this research on road and rail transport sectors, which can be read together with recent PIDS studies on the water transport sector[1] and the air transport sector.[2] The assessment contained in this road and rail transport study is timely because it will help the current administration formulate strategies for providing adequate and well-functioning infrastructure for all Filipinos. The investments on road and rail transport infrastructure assets and services should be at a level that will not only promote economic growth in the aftermath of the COVID-19 pandemic but also enhance connectivity and productivity in the medium to long term, and thereby reduce poverty and inequality.

1.1 Objectives of the study

The general objective of the study is to assess the state of the country's road and rail transport infrastructure, identify issues and challenges in the implementation of the public road and rail transport infrastructure program, and formulate policy recommendations.

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[1] See Francisco, K. and Lim, V. 2021. Government Strategies in the Water Transport Sector: A Closer Look at Philippine Ports. DP 2021-47. Quezon City: Philippine Institute for Development Studies. https://www.pids.gov.ph/publication/discussion-papers/government-strategies-in-the-water-transport-sector-a-closer-look-at-philippine-ports..

[2] See Francisco, K. and Lim, V. 2022. Philippine Air Transport Infrastructure: State, Issues, Government Strategies. DP 2022-62. https://pids.gov.ph/publication/discussion-papers/philippine-air-transport-infrastructure-state-issues-government-strategies.

The specific objectives are as follows:

a. to present and analyze the status of the quantity and quality of the country's road and rail transport infrastructure;

b. to analyze the planning-programming-budgeting-implementation linkages in the road and rail transport infrastructure program and review the recent progress;

c. to discuss issues, challenges and lessons learned; and

d. to formulate policy recommendations.

1.2 Analytical framework and research method

Underlying our analysis is the view that we derive economic benefits from transport investments at the macro and microeconomic levels (Button 2010). At the macro level, economists examine the ways and extent to which transport infrastructure investment contributes to the economic development of the country and its sub-national regions. At the microeconomic level, economists are concerned with net benefits from individual transport infrastructure projects or programs.

At the macro level of analysis, the contribution of overall infrastructure investments to economic development has been repeatedly established and updated through new data processed in various studies. An illustration in the case of the Philippines is a simulation by Komatsuzaki (2019) of how public infrastructure investment acceleration results in sustained economic growth. Komatsuzaki's study simulated the impact of a public infrastructure investment increase of 1.2% of gross domestic product (GDP) in the Philippines from 2016 to 2017 and the impact of an increase of 2% of GDP in subsequent years. The study also incorporated scenarios on tax reform accompanying the investment expansion. In the simulations, all scenarios result in sustained gains in economic output, driven by the underlying structure in the model simulation wherein improving public infrastructure contributes to productivity gain for the economy. As road and rail transport is a subsector of infrastructure, we take this positive relationship between overall public infrastructure investment and economic growth as extending to road and rail transport infrastructure investment.

The microeconomic level of analysis for public transport investment programs happen during appraisals of specific projects, where decision making is anchored on project-specific social and economic returns and backed by project appraisal techniques employing cost-benefit analysis. In the case of the Philippine public investment program, the NEDA-Investment Coordinating Committee (ICC) and the implementing agencies perform the project appraisal and the NEDA Board or the ICC-Cabinet Committee approves the projects (with the level of approval depending on the amount of investment).

Underpinning this cost-benefit analysis is the economic concept of Marshallian[3] welfare surplus or consumer surplus, which is usually represented in project or program appraisal as benefit valuation in terms of monetary units. Consumer surplus is generated when the price that is paid for a good or service is higher than the willingness-to-pay price for such good or service. In the case of infrastructure projects, consumer surplus is generated when the beneficiary community receives benefits that are worth higher than the cost of (or payments made for) the projects. Project implementers therefore endeavor to avoid or minimize time and cost overruns to preserve the consumer surplus that had been one of the bases for project approval. Indeed, as this study shows in Section 4, time and cost overruns are among the frequently encountered implementation challenges in the road and rail transport sector.

In presenting our data and analysis, we mainly use a descriptive research method where documents and quantitative and qualitative data are reviewed to clarify facts, explain with examples, and establish links between facts. We relied on secondary data from international and government sources. Data that are not available online but are in the custody of technical staff in government agencies were requested through official coordination. The databases used include the Global Competitiveness Index, the DPWH Atlas, and the Philippine Statistics Authority Yearbook. NEDA provided the various iterations of the Public Investment Program and implementing agencies provided program-specific documents. We also held focus group discussions and key informant interviews with representatives of implementing agencies to augment the findings from our secondary data collection.

2. Assessment of road and rail transport infrastructure quantity and quality

In the following discussions, we present within country assessment and cross-country comparisons. We first assess the current stock and quality of the road and rail infrastructure within the Philippines and identify where the insufficiency of stock and weaknesses in quality are most prominent. Then we compare the competitiveness ranking of the Philippines with other ASEAN countries in terms of general infrastructure, transport infrastructure, and specific indicators in the road and rail transport sectors.

2.1. Current road and rail transport infrastructure

The country's current road network has a total length of 205,045.97 kilometers (km.), consisting of: (a) 34,250.97 km. of national roads, including those in the Bangsamoro Autonomous Region of Muslim Mindanao (BARMM) (DPWH 2022a), and (b) 170,795 km. of local roads.[4] The national roads include 8,546 bridges with a total length of 388,057 linear meters[5] (DPWH 2021). The distribution of local roads is as follows: 31,501 km. of provincial roads, 17,222 km. of city

[3] The concept is named after Alfred Marshall, the author of *Principles of Economics* (1890), who comprehensively tied together the economic concepts of supply and demand and marginal utility.

[4] DILG-Office of Project Development Services team (DILG, Quezon City), in discussion with the authors via WebEx, August 12, 2021, Quezon City.

[5] The bridge data in the DPWH Atlas 2021, however, do not include the numbers for the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM).

roads, and 122,072 km. of municipal and barangay roads; these figures, however, do not include bridges because the Department of the Interior and Local Government (DILG)'s inventory was not yet complete at the time of writing.[6] The Guidelines on the Enhancement of the Local Roads Network Development Plan, which covers both local roads and bridges, nevertheless mentioned that the approximate total of local roads is 190,000 km (DILG 2020).

The country's rail network, on the other hand, consists of 395 km. of operational routes, 87 stations, and 889 train cars as of end-2021 (DOTr 2021). The rail systems are: (a) an intra-Luzon commuter rail system owned and operated by the government corporation Philippine National Railways (PNR), with three lines operational as of October 6, 2022 (viz., the PNR Metro Commuter Line, the PNR Inter-Provincial Commuter Line, and the PNR Bicol Commuter Line); and (b) three mass transit systems operating within Metro Manila (viz., the government-owned LRT-1 and LRT-2 and the privately owned MRT-3). We present the details of the current state of the country's road and rail assets in the following discussions.

2.2.1. Roads

To better appreciate the current state of roads and bridges, some explanations on road classifications are necessary. In 2014, the functional classification of roads was re-formulated (see Box 1) and some lengths of national roads were categorized as national tertiary roads (i.e., roads under the DPWH management but are performing local function). In the sharing of funding and management responsibilities, national roads are managed by the DPWH while local roads (provincial, city and municipal roads) are managed by local governments. The DPWH deemed the new classification necessary because there are roads that are actually performing local road functions and yet they continue to be managed by the DPWH.

Box 1. Road classification system

National Primary Roads
- Directly connects major cities (with population of 100,000 people or more)
  Cities within metropolitan areas are not covered by the criteria.

National Secondary Roads
- Directly connects cities to National Primary Roads, except in metropolitan areas
- Directly connects major ports and ferry terminals to National Primary Roads
- Directly connects major airports to National Primary Roads
- Directly connects tourist service centers to National Primary Roads or other National Secondary Roads
- Directly connects cities not included in the category of major cities
- Directly connects provincial capitals within the same region
- Directly connects major national government infrastructure to National Primary Roads or other National Secondary Roads

[6] DILG-Office of Project Development Services team (DILG, Quezon City), in discussion with the authors via WebEx, August 12, 2021, Quezon City.

National Tertiary Roads
• Other existing roads under the DPWH which perform local road functions

Provincial Roads
• Connect cities and municipalities without traversing National Roads
• Connect National Roads to barangays through rural areas
• Connect to major provincial government infrastructure

Municipal and City Roads
• Roads within poblacion (town center)
• Roads that connect to Provincial and National Roads
• Roads that provide inter-barangay connections to major municipal and city infrastructure without traversing Provincial Roads

Barangay Roads
• Other public roads (officially turned over) within the barangay and not covered in the above definitions

Expressways
• Highways with limited access, normally with interchanges; may include facilities for levying tolls for passage in an open or closed system.

Source: DPWH (2021, p.2, Table A).

Some road network data can be extracted through the Geoportal Philippines (geoportal.gov.ph) being managed by National Mapping and Resource Information Authority (NAMRIA). The Road Net Map App of the portal provides a mapping of road networks with layers for national, provincial, city, municipal, barangay, private, company, National Irrigation Authority (NIA),[7] and farm-to-market roads (NAMRIA n.d.). Satellite imagery is provided by ArcGIS Online basemap and Google Map basemap, two of the the eight basemaps being used in the portal. Although its name bears "app", the Road Net Map App is not a downloadable app but a webpage (https://geoportal.gov.ph/gpapps/roadnet) on the Geoportal Philippines site, which means one has to stay on the webpage and click on road layers and input data to be able to get results. Road network maps by province and per road layer can be displayed by selecting a province on the province dropdown menu and clicking on the desired road layer. Measurements of distances and areas can also be displayed by inputting the latitude and longitude data or drawing a line for distance measurements, or drawing a polygon for area measurements. Note, however, that measuring distance and area is something which can already be done on the free web mapping platform Google Map. So the unique value added of the Road Net Map App is the categorization of roads into national, provincial, city, municipal, barangay, private, company, NIA, and farm-to-market roads. But the Road Net Map App is still a work in progress at the time of writing and the layering of road categories can be done for four provinces only that are on the App's dropdown

[7] NIA roads are constructed by the NIA to facilitate access to irrigation systems.

menu—Surigao del Sur, Surigao del Norte, Agusan del Sur and Siquijor. Thus, the App is not usable at this point in consolidating national-level data by road categories. But further developments on the Road Net Map App should be anticipated as its features, especially the categorization and layering, could be useful inputs to road sector analysis.

Given that the DPWH's databases (various editions of the DPWH Atlas) are on national roads only and the alternative resource, particularly the Road Net Map App, is not yet complete, the comprehensive assessment of road lengths and quality in the following discussions is done for national roads only. The assessment for local roads, on the other hand, is not as comprehensive and is based on an ad hoc municipal roads survey undertaken by the PIDS for a separate project.

Table 1 below shows categories of national roads and their total length every year from 2007 to 2021. Figure 1 presents the graphical representation of the total lengths and the growth rates. It is likely that future increases in national road length will not be dramatic given that the DPWH Atlas 2021 states that the road network is already "mature" and there may be very few cases that will warrant a change in classification from local road to national road (DPWH 2022a) (also called within the transport bureaucracy as "conversion" from local road to national road).

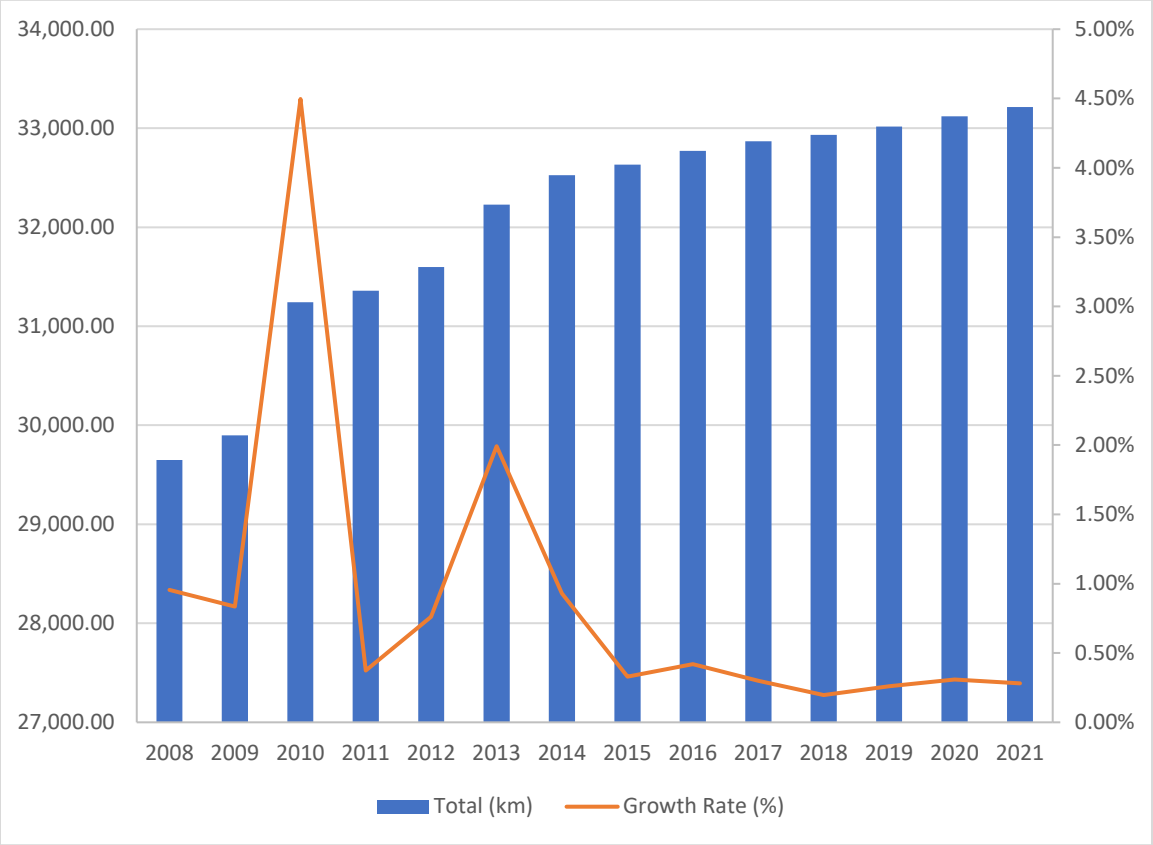
Table 1. Length of national roads by category, 2007-2021

Year	National Primary (km.)	National Secondary (km.)	National tertiary (km.)	Total (km.)	Annual Increase (km.)	Growth Rate (%)
2007	15,588.88	13,780.82		29,369.70		
2008	15,663.45	13,989.90		29,650.36	280.66	0.96%
2009	15,730.56	14,167.53		29,898.09	247.73	0.84%
2010	15,871.91	15,370.47		31,242.38	1,344.29	4.50%
2011	15,986.72	15,372.40		31,359.12	116.74	0.37%
2012	16,056.47	15,541.21		31,597.68	238.56	0.76%
2013	16,078.72	16,148.22		32,226.93	629.25	1.99%
2014	7,060.39	14,051.37	11,414.73	32,526.50	299.57	0.93%
2015	7,066.74	14,118.49	11,448.14	32,633.37	106.87	0.33%
2016	7,067.42	14,148.04	11,554.81	32,770.27	136.90	0.42%
2017	7,066.58	14,248.89	11,552.60	32,868.07	97.80	0.30%
2018	7,068.23	14,284.60	11,579.88	32,932.71	64.64	0.20%
2019	7,071.85	14,339.06	11,607.34	33,018.25	85.54	0.26%
2020	7,093.81	14,394.70	11,631.36	33,119.87	101.62	0.31%
2021	7,089.15	14,494.57	11,628.90	33,212.62	92.13	0.28%

Note: Numbers may not exactly add up to totals due to rounding. The 2021 figures are as of October 18, 2021. The time series, however, do not include figures for the BARMM (or even the Autonomous Region of Muslim Mindanao or ARMM, the precursor of BARMM) because the previous editions of the *DPWH Atlas* presented only the data for roads under the DPWH jurisdiction. The BARMM roads are under the jurisdiction of the BARMM Ministry of Transportation and Communications.

Source: DPWH (2016; 2019; 2021).

Figure 1. Total length and growth of national roads, 2007 to 2021



Source: DPWH (2016; 2019; 2021; 2022).

Increases in national road length are usually attributed to "newly-converted road sections, newly improved gap sections, completed flyover and wye length, and modified road configuration from single to dual carriageway" (DPWH 2019).

In terms of surface type, concrete roads are the dominant surface type, followed by asphalt, gravel and earth roads. Table 2 and Figure 2 show the length and shares of national roads per surface type in 2016 and in 2021, the latest data availability year. Data show increases in the shares of higher quality roads (i.e., higher than gravel and earth roads). Concrete roads increased from 20,397.67 km. in 2016 to 21,666.53 km. in 2021 and its share also increased from 62.64% in 2016 to 65.24% in 2021. Asphalt roads increased from 9,612.32 km. in 2016 to 11,100.92 km. in 2021 and its share also increased from 29.33% in 2016 to 33.42% in 2019.

Nevertheless, the fact that there remains gravel and earth roads, which are 1.25% and 0.09% respectively in 2021, means that crucial quality improvements still have to be made. National roads play critical roles in connecting cities, provincial capitals, airports, seaports, and tourism centers and the presence of gravel roads and earth roads in the links weaken the connectivity.

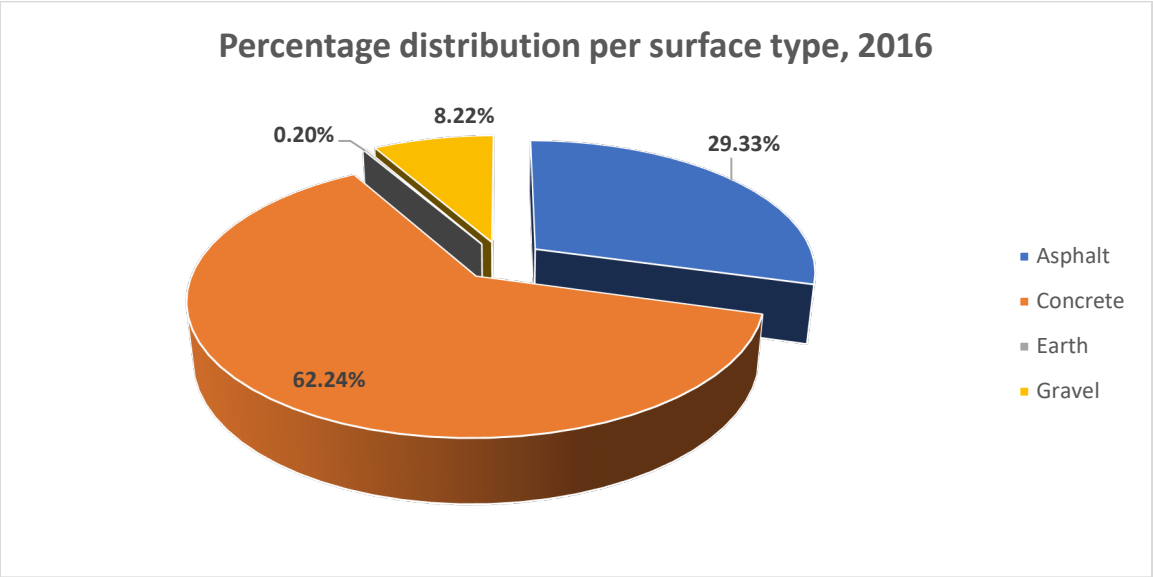
Table 2. Length and percentage of national roads per surface type, 2016 and 2021

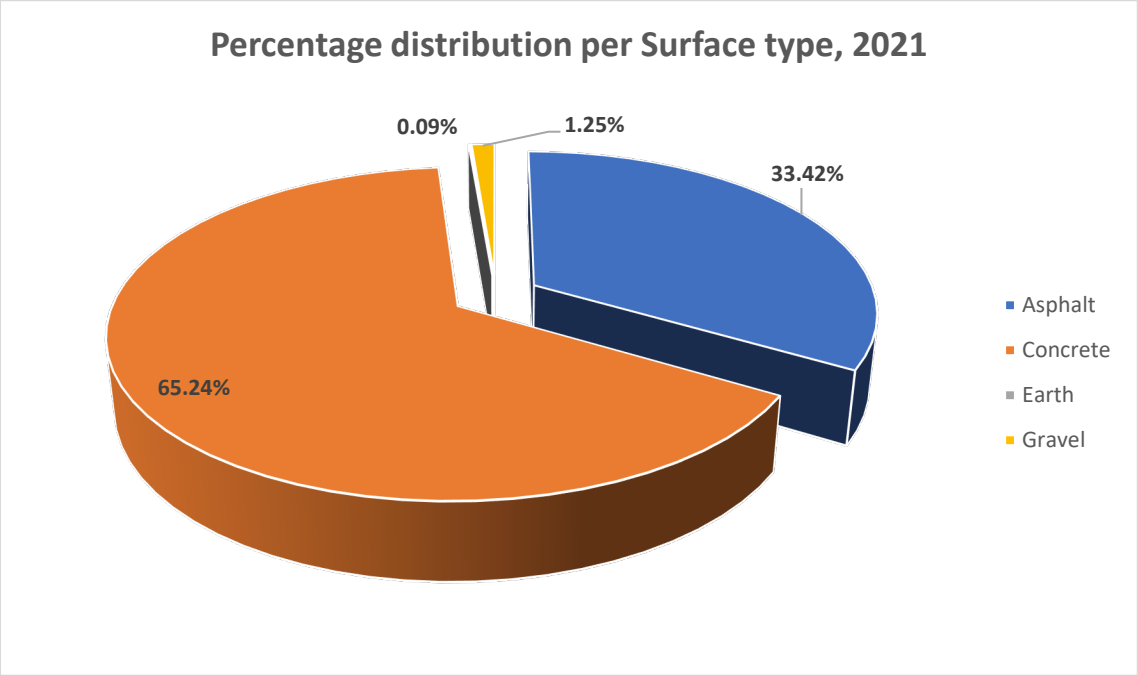
Surface Type	2016		2021	
	Length (km.)	Percentage Distribution (%)	Length (km.)	Percentage Distribution (%)
Concrete	20,397.67	62.24	21,666.53	65.24
Asphalt	9,612.32	29.33	11,100.92	33.42
Gravel	2,693.59	8.22	414.41	1.25
Earth	66.68	0.2	30.75	0.09
Total Road Length (km.)	32,770.26		33,212.61	

Note: The 2021 figures are as of October 18, 2021 and exclusive of BARMM. Comparing the 2021 total length inclusive of BARMM roads with the 2016 total length on the DPWH record to show improvement is not appropriate because the 2016 total does not include the data for ARMM, the precursor of BARMM.

Source: DPWH (2016; 2021).

Figure 2. Road surface types, percentage distribution, 2016 and 2021





Note: The 2021 figures are as of October 18, 2021 and exclusive of BARMM. Comparing the 2021 total length inclusive of BARMM roads with the 2016 total length to show improvement is not appropriate because the 2016 total does not include the data for ARMM, the precursor of BARMM.

Source: DPWH (2016; 2021).

By regional distribution, Table 3 shows that as of 2021, Region VI or the Western Visayas Region has the longest concrete roads, with a total of 2,256.96 km. The National Capital Region (NCR) has the shortest concrete road length at only 430.62 km. In terms of aggregate asphalt road length,

Region IV-A has the longest length at 1,647.30 km. while the BARMM has the shortest at only 43.61 km. Region IX or the Zamboanga Peninsula Region has the longest length of gravel and earth roads at 98.22 km. and 15.94 km., respectively.

Table 3. Road length per region (in km.), by surface type, 2021

Region	Concrete	Asphalt	Gravel	Earth	Grand Total
CAR	1,930.95	264.2	70.04	0.04	2,265.23
NCR	430.62	735.62	0	0	1,166.24
Region I	755.68	955.33	0.32	0	1,711.33
Region II	1,479.42	510.18	27.99	0.92	2,018.51
Region III	1,190.24	1,197.38	0.91	0	2,388.53
Region IV-A	895.15	1,647.30	0	0	2,542.45
Region IV-B	2,097.15	180.65	18.54	1.38	2,297.71
Region V	1,463.82	959.85	22.25	3.23	2,449.14
Region VI	2,256.96	806.7	0.76	0	3,064.42
Region VII	1,496.24	854.83	7.07	0.49	2,358.62
Region VIII	1,429.45	1,125.95	4.96	0	2,560.37
Region IX	1,191.02	346.48	98.22	15.94	1,651.66
Region X	1,403.10	520.43	45.87	8.14	1,977.53
Region XI	1,278.98	378.18	47.11	0	1,704.27
Region XII	1,160.81	331.86	36.78	0.61	1,530.07
Caraga	1,206.94	285.99	33.6	0	1,526.53
BARMM	984.66	43.61	10.03	0.06	1,038.35
Grand Total	22,651.19	11,144.54	424.44	30.81	34,250.97

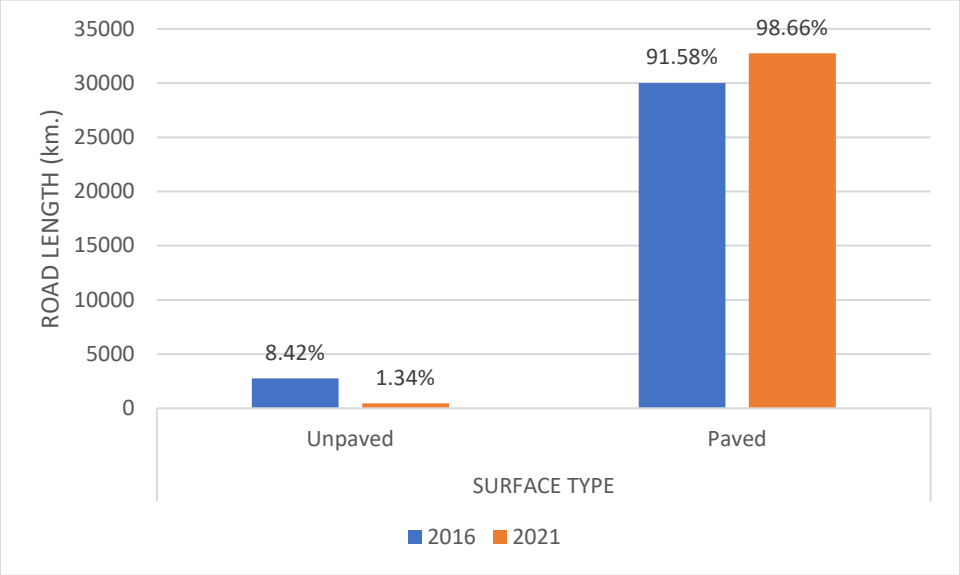
Notes: Figures are as of October 18, 2021.
CAR - Cordillera Administrative Region
NCR - National Capital Region
BARMM - Bangsamoro Autonomous Region in Muslim Mindanao

Source: DPWH (2021).

The surface types mentioned above can also be categorized in terms of status of pavement, that is, “paved roads” for concrete and asphalt finish, and “unpaved roads” for gravel and earth surfaces. Data show general improvement in road quality in terms of paving. Figure 3 below shows the increase in the

aggregate length of paved national roads and the decrease in unpaved national roads from 2016 to 2021 (given data on roads under the DPWH jurisdiction only, i.e., exclusive of BARMM[8]). In five years, the length of paved roads increased from 30,009.99 km. or 91.58% of the total in 2016 to 32,767.46 km. or 98.66% of the total in 2021—a total of 2,757.47 addition to the paved national road network under the DPWH jurisdiction. Paving activities reduced the unpaved roads from 2,760.27 km. or 8.42% of the total in 2016 to 445.16 km. or 1.34% of the total in 2021. According to the DPWH, this development can be attributed to road conversion as well as the integration of newly improved gap sections and completed Y-lengths.

Figure 3. Length and percentage of national roads by pavement status, 2016 vs. 2021



Note: The 2021 figures are as of October 18, 2021 and exclusive of BARMM. Comparing the 2021 total length inclusive of BARMM roads with the 2016 total length to show improvement is not appropriate because the 2016 total does not include the data for ARMM, the precursor of BARMM.

Source: DPWH (2016; 2021).

The annual paving rate, however, has been decelerating, as shown by Table 4 below. In 2015-2016, the growth in paved roads was 3.77%, then decelerated annually afterwards until it stood at only 0.74% in 2021.

[8] The 2021 database includes BARMM. But comparing the 2021 total length of paved and unpaved roads inclusive of BARMM roads with the 2016 total length to show improvement is not appropriate because the 2016 database does not include the data for ARMM, the precursor of BARMM.

Table 4. Length and growth of paved roads, 2016-2021

Year	Length (km.)	Growth Rate (%)
2016	30,009.99	3.77
2017	31,035.31	3.42
2018	31,622.78	1.89
2019	32,087.08	1.47
2020	32,527.05	1.37
2021	32,767.46	0.74

Note: The 2021 figures are as of October 18, 2021 and exclusive of BARMM. Comparing the 2021 total length inclusive of BARMM roads with the 2016 total length to show improvement is not appropriate because the 2016 total does not include the data for ARMM, the precursor of BARMM.

Source: DPWH (2016; 2021).

Across the regions, Table 5 below shows that NCR and Region IV-A already have 100% paved national roads. Regions with 99% paved national roads are Region I (Ilocos Region), Region III (Central Luzon), Region VI (Western Visayas), Region VII (Central Visayas), and Region VIII (Eastern Visayas). The region with the lowest percentage of paved national roads is Region IX (Zamboanga Peninsula) at 93.09%.

Table 5. Length and percentage of paved national roads per region, 2021

Region	Total Length (km.)	Paved Length (km.)	Paved Percentage (%)
CAR	2,265.23	2,195.15	96.91
NCR	1,166.24	1,166.24	100.00
Region I	1,711.33	1,711.01	99.98
Region II	2,018.51	1,989.60	98.57
Region III	2,388.53	2,387.62	99.96
Region IV-A	2,542.45	2,542.45	100.00
Region IV-B	2,297.71	2,277.80	99.13
Region V	2,449.14	2,423.66	98.96
Region VI	3,064.42	3,063.66	99.98
Region VII	2,358.62	2,351.07	99.68
Region VIII	2,560.37	2,555.41	99.81
Region IX	1,651.66	1,537.50	93.09
Region X	1,977.53	1,923.53	97.27
Region XI	1,704.27	1,657.16	97.24
Region XII	1,530.07	1,492.67	97.56
Caraga	1,526.53	1,492.93	97.80
BARMM	1,038.35	1,028.27	99.03

Source: DPWH (2021).

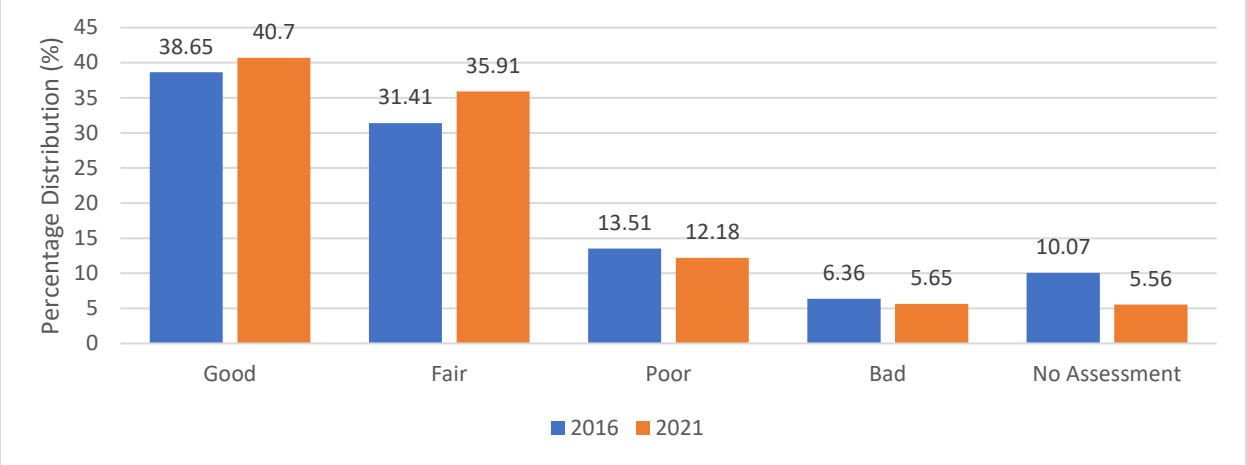
But the improvement in quality in terms of increase in paved roads is nuanced by the actual condition that the paved roads are in. The following categories of road condition are employed in the Philippines: good, fair, poor, and bad. The differences are in terms of treatment or maintenance measures that are needed, described by the DPWH as follows:

Good – Little or no maintenance required (routine maintenance)
Fair – Needs some partial/full depth repairs (preventive maintenance)
Poor – Needs extensive full depth repairs, some full slab replacement/ rehabilitation
Bad – Needs to rebuild pavement (total reconstruction)

To assess the condition of national roads, the DPWH conducts the Visual Road Condition survey annually. However, there are instances when some road sections are not assessed such as when these are under construction, are committed for construction, or have bridges or segments with lengths below the 50-meter gauging length. Thus, the data on road condition also include the category "no assessment".

The DPWH applies the road condition categorization above applies not only to paved roads but also unpaved roads because even gravel- and earth-surfaced roads need maintenance. For the total national road network, Figure 4 below shows the percentage distribution of the road condition (for the aggregage of paved and unpaved roads) in 2016 vs. 2021. Note from the figure that there has been an increase in the share of roads in good condition and fair condition in 2021.

Figure 4. Percentage distribution by road condition, 2016 vs. 2021

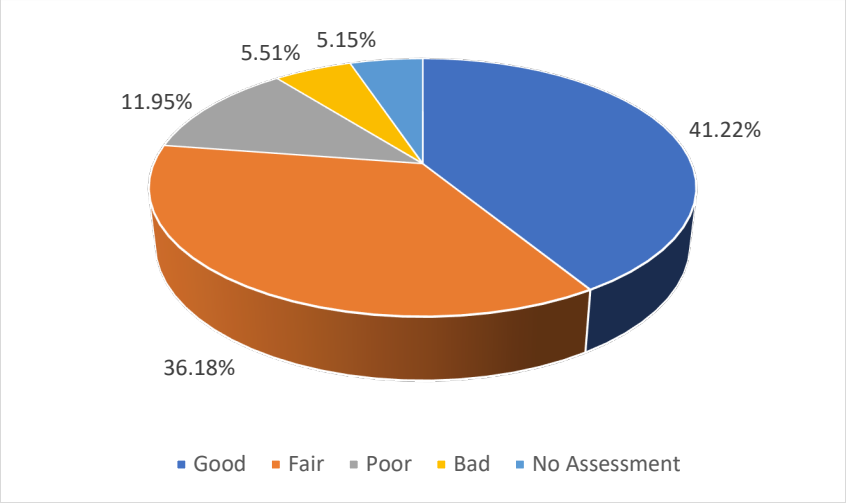


Note: The 2021 figures are as of October 18, 2021 and exclusive of BARMM. Comparing the 2021 total figures inclusive of BARMM roads with the 2016 total figures to show quality improvement is not appropriate because the 2016 total does not include the data for ARMM, the precursor of BARMM.

Source: DPWH (2016; 2021).

But if we are to focus on paved national roads only, we see that the condition of these roads needs significant improvement. Figure 5 below shows that as of 2021, only 41.22% of paved national roads under the DPWH jurisdiction can be considered to be under good condition.

Figure 5. Condition of paved national roads in 2021



Note: Roads under the DPWH jurisdiction only.

Source: DPWH (2021).

Road density, or the ratio of the total length of the road network (in km.) to a specified land area (in sq. km.), is also an important indicator given that it is highly correlated with the amount of developed land surface. Highly developed areas tend to have higher road densities. High road density in an area implies that road development and economic activities in such area reinforce each other. A well-developed road transport network is a significant driving force of growth and development as it facilitates market access, especially for agricultural goods, and improves the mobility of social services.

Table 6 below provides the road density of the country and the regions from 2016 to 2021. The roads considered in the calculation are the primary, secondary, and tertiary national roads. Across the years, NCR is the leading region in terms of road density and it leads by a very huge margin vis-à-vis other regions. As of 2021, its road density is at 188.24 km. of roads per 100 sq. km. of land area. Region IV-A has the second highest road density, but its density of 15.34 km. of roads per 100 sq. km. of land is a far second from the NCR. Region XII has the lowest road density at 6.71 km. of roads per 100 sq. km. of land. Overall, the nationwide road density (exclusive of BARMM) gradually increased annually and as of 2021, the density is 10.68 km. of roads per 100 sq. km. of land.

Table 6. National road density per region (km. of roads per 100 sq. km. of land), 2016-2021

Region	2016	2017	2018	2019	2020	2021
CAR	11.8	11.39	11.39	11.39	11.45	11.43
NCR	187	187.5	188.39	188.24	188.24	188.24
Negros Island Region (NIR)[a]	12.3	n.a.	n.a.	n.a.	n.a.	n.a.
Region I	12.9	12.86	12.86	12.95	13.11	13.2
Region II	6.43	6.54	6.65	6.73	6.77	6.77
Region III	10.7	10.7	10.7	10.7	10.7	10.9
Region IV-A	15.2	15.34	15.34	15.34	15.34	15.34
Region IV-B	7.76	7.76	7.76	7.76	7.76	7.76
Region V	13.2	13.17	13.19	13.19	13.35	13.52
Region VI	15.1	14.58	14.58	14.7	14.73	14.75
Region VII	16.7	14.52	14.59	14.67	14.69	14.86
Region VIII	10.9	11.02	11.02	11.03	11.02	11.02
Region IX	9.77	9.77	9.77	9.77	9.77	9.77
Region X	9.59	9.58	9.58	9.63	9.67	9.67
Region XI	8.25	8.25	8.26	8.26	8.34	8.34
Region XII	6.79	6.79	6.83	6.83	6.83	6.71
Caraga	7.2	7.2	7.2	7.19	7.2	7.23
ARMM/BARMM[b]	2.81[c]	n.a.	n.a.	n.a.	n.a.	n.a.
Nationwide	**10.5**	**10.57**	**10.59**	**10.62**	**10.65**	**10.68**

Notes: n.a. = not applicable

[a]The 2016 regional road density report of the DPWH incorporates the Negros Island Region (NIR) road density, which stood at 12.34 km. of roads per 100 sq. km. of land. The NIR was abolished in 2017 by virtue of Executive Order No. 183, series of 2017. Afterwards, Negros Oriental became administratively part of Region VI again, Negros Oriental became administratively part of Region VII again, and the road lengths and land areas used in the computation of the NIR road density were distributed across Regions VI and VII.

[b]The ARMM became BARMM in 2020.

[c]No data for ARMM or BARMM road density are available at the DPWH. The 2016 road density above is computed by the authors based on the road length data from the Bangsamoro Development Planning Authority and the PSA's land area estimate for ARMM.

Source: DPWH (2016; 2021) except for ARMM data in 2016.

Of the total 34,250.97 km. of national roads as of 2021, 626 km. are high standard highways or expressways operated as controlled-access highways or tollways by private companies (DPWH n.d.). Most of these are in Luzon. The only tollway operating outside Luzon is the 8.9 km. Cebu-Cordova Link Expressway, a toll bridge connecting Cebu City and Cordova municipality in Cebu province, Visayas.

With respect to local roads, there is no easily accessible central database on local roads with sufficient details on quality per local road category. (The local roads are under the jurisdiction of 81 provinces, 146 cities, 1,488 municipalities and 42,045 barangays.) Nevertheless, key informants from the DILG-Office of Project Development Services conveyed that as of 2021, 44 percent of the 170,795 total km. of local roads are paved roads and the rest, 56 percent, are unpaved roads (meaning, either gravel or earth roads).[9]

The 2017 municipal roads inventory for a PIDS study on the Local Government Support Fund (LGSF) provides partial insights on the quality of local roads. Table 7 below shows that for the 91 percent of LGSF-covered LGUs that submitted data (1,248 LGUs out of 1,373 LGUs), a large gap exists in the paving of municipal roads. Of the total road lengths from the submitted data, 47.42% are unpaved roads. The need to pave municipal roads is a huge concern in many regions, with LGUs in MIMAROPA and Region XI registering high unpaved percentages of 76.51% and 75.42%, respectively.

[9] DILG-Office of Project Development Services team (DILG, Quezon City), in discussion with the authors via WebEx, August 12, 2021, Quezon City.

Table 7. Quality of municipal roads in terms of pavement status (selected LGUs only) in 2017, by region

Region	Number of LGUs			Paved Roads (km)		Unpaved Roads (km)		Total Length of Roads (km)	Percentage of Unpaved Roads (%)
	Total	With Submission	Without Submission	Concrete	Asphalt	Gravel	Earth		
CAR	75	68	7	360.16	12.38	276.04	564.48	1,213.06	69.29
NCR	1	1	0	5.80	2.18	-	-	7.98	0.00
Region I	116	116	0	1,015.94	46.21	195.42	87.81	1,345.38	21.05
Region II	89	86	3	799.17	27.31	680.44	362.35	1,869.27	55.79
Region III	116	90	26	854.61	91.79	260.31	84.79	1,291.50	26.72
Region IV-A	123	119	4	833.27	104.43	139.60	178.96	1,256.26	25.36
MIMAROPA	71	55	16	245.31	3.56	373.06	437.34	1,059.27	76.51
Region V	107	53	54	453.96	24.63	66.69	137.25	682.53	29.88
Region VI	117	114	3	504.74	28.43	57.47	19.17	609.81	12.57
Region VII	116	114	2	637.45	47.76	311.50	96.53	1,093.24	37.32
Region VIII	136	135	1	1,187.50	22.00	257.91	309.26	1,776.67	31.92
Region IX	67	60	7	331.20	28.31	412.88	140.20	912.59	60.61
Region X	84	84	0	554.80	3.46	252.58	210.67	1,021.51	45.35
Region XI	43	43	0	301.07	17.48	765.44	212.14	1,296.13	75.42
Region XII	45	45	0	376.64	36.09	566.14	353.60	1,332.47	69.03
Caraga	67	65	2	277.45	3.55	382.90	138.48	802.38	64.98
Total	**1,373**	**1,248**	**125**	**8,739.07**	**499.57**	**4,998.38**	**3,333.03**	**17,570.05**	**47.42**

Note: The figures may not add up due to rounding. There are no available data for BARMM.

Source: Diokno-Sicat et al. (2020).

2.2.2 Bridges

Bridges play a strategic and critical role in pursuing connectivity, especially given the terrain in a country like the Philippines—archipelagic, mountainous, and with numerous river systems. To monitor and manage the stock of national bridges in the Philippines, the DPWH established the Bridge Management System in 2003. The system is used to collect bridge data, such as the type of structure, length, and condition, annually.

As shown in Table 8, the total number of national bridges increased from 8,161 bridges (with an aggregate length of 364,163 linear meters) from 2016 to 8,546 bridges (with an aggregate length of 388,057 linear meters) in 2021. By type of material, majority of the bridges are concrete, a permanent type of bridge structure. Concrete bridges increased not only in number and length but also in terms of share in the aggregate length: its share increased from 75.76% of the total length in 2016 to 76.62% of the total in 2021. Steel bridges are also permanent, and their number and length also increased from 2016 to 2021, although its share in the total declined from 23.48% in 2016 to 23.09% in 2019. As more bridges were improved and their structure made more permanent, the number and total length of temporary bridges (bailey and timber) declined dramatically. From 2016 to 2021, bailey bridges (a type of portable, prefabricated, truss bridge) declined by 66% in number and by 60% in length, and timber bridges declined by 400% in number and by 79% in length.

Table 8. Number and length of national bridges, 2016 vs. 2021

Material	2016		2021	
	Number	Length (linear meter)	Number	Length (linear meter)
Concrete (Permanent)	6,625	275,893	6,988	297,313
Steel (Permanent)	1,454	85,496	1,532	89,614
Bailey (Temporary)	67	2,545	23	1,001
Timber (Temporary)	15	229	3	128
Grand Total	8,161	364,163	8,546	388,057

Note: The 2021 figures are as of November 4, 2021 and exclusive of BARMM. Comparing the 2021 total figures inclusive of BARMM bridges with the 2016 total figures to show improvement is not appropriate because the 2016 total does not include the data for ARMM, the precursor of BARMM.

Source: DPWH (2016; 2021).

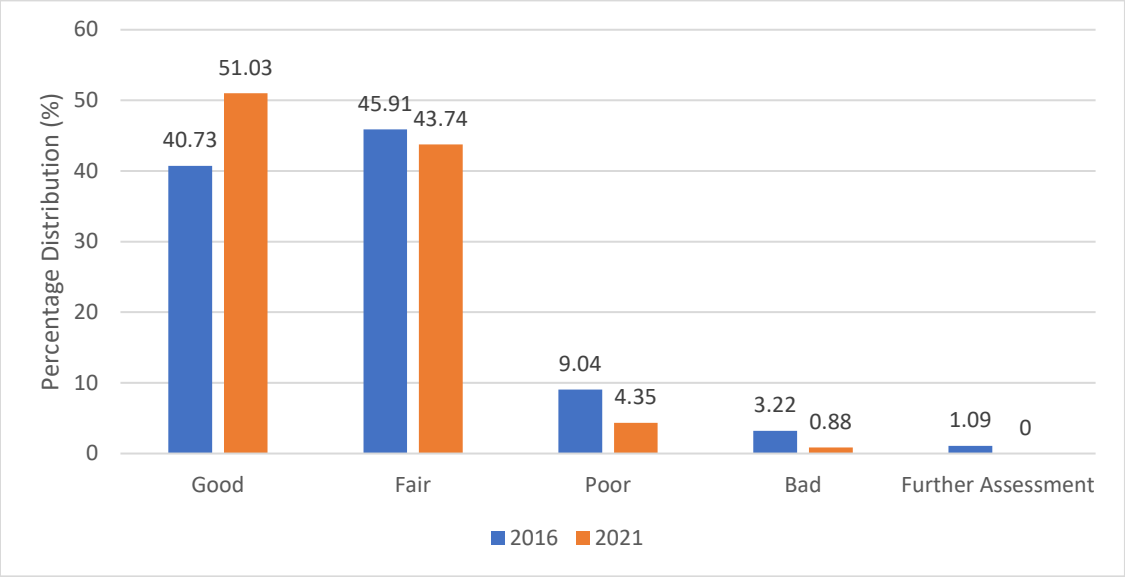
The DPWH Atlas attributed the significant increase in the total number of bridges to the following: additional bridges from the newly converted national roads; newly constructed bridge structures across river crossings including box culverts; replacement of spillways and overflow structures with either permanent or temporary bridges; and implementation of the foreign-assisted bridge programs.

In terms of condition, bridges are also assessed based on the needed countermeasures to maintain them. The categories of bridge condition are described below. In cases when the bridges are under construction, under major maintenance work, or washed-out, they are categorized as for "Further Assessment" in the DPWH database.

Good – needs routine maintenance only
Fair – needs major maintenance (repair, strengthening, or protective works)
Poor – needs major maintenance or upgrading
Bad – needs upgrading or replacement

Figure 6 below compares percentage distribution of the condition of bridges in 2016 and 2021 based on the total number of bridges. The graph shows that development in the general condition of national bridges progressed as the percentage share of "Good" condition increased while the shares of the "Fair", "Poor" and "Bad" conditions decreased. The data also show that as of 2021, 51.03% (4,361 bridges) are in good condition, 43.74% (3,738 bridges) are in fair condition, 4.35% (372 bridges) are in poor condition, and 0.88% (75 bridges) are in bad condition.

Figure 6. Condition of national bridges, 2016 vs. 2021



Note: The 2021 figures are as of November 4, 2021 and exclusive of BARMM. Comparing the 2021 total figures inclusive of BARMM bridges with the 2016 total figures to show improvement is not appropriate because the 2016 total does not include the data for ARMM, the precursor of BARMM.

Source: DPWH (2016; 2021).

Table 9 below shows the distribution, in terms of number and by type of material, of bridges across the regions in 2021. Region VIII (Eastern Visayas) has the highest number of bridges at 899 bridges, followed by Region VI (Western Visayas) with 773 bridges, and Region III (Central Luzon) with 743 bridges. The regions with the least number of bridges are Region IX (Zamboanga Peninsula) with 327 bridges, Region XI (Davao Region) with 308 bridges, and NCR with 303

bridges. Among the regions, Region VIII (Eastern Visayas) has the most number of concrete bridges at 704 concrete bridges, followed by Region III (Central Luzon) with 623 concrete bridges, and Region VI (Western Visayas) with 600 concrete bridges.

Table 9. Regional distribution of national bridges, by number and material, 2021

Region	Number of Concrete Bridges	Number of Steel Bridges	Number of Bailey Bridges	Number of Timber Bridges	Grand Total
CAR	222	119	3	0	344
NCR	289	14	0	0	303
Region I	476	85	0	0	561
Region II	411	86	3	0	500
Region III	623	120	0	0	743
Region IV-A	595	76	1	0	672
Region IV-B	545	86	6	2	639
Region V	595	95	0	0	690
Region VI	600	172	1	0	773
Region VII	475	104	0	0	579
Region VIII	704	191	3	1	899
Region IX	245	82	0	0	327
Region X	330	91	2	0	423
Region XI	247	58	3	0	308
Region XII	284	45	1	0	330
Caraga	347	108	0	0	455
Grand Total	**6,988**	**1,532**	**23**	**3**	**8,546**

Note: The 2021 figures are as of November 4, 2021 and exclusive of BARMM. The source DPWH dataset does not include BARMM.

Source: DPWH (2021).

Table 10 below shows the distribution of national bridges by length and by material across the regions in 2021. Region III (Central Luzon) has the longest aggregate length of bridges at 38,043 linear meters, followed by Region VIII (Eastern Visayas) with 35,825 linear meters, and Region VI (Western Visayas) with 35,507 linear meters. The regions with the shortest aggregate length of bridges are Region IX (Zamboanga Peninsula) with 14,374 linear meters, Cordillera Administrative Region (CAR) at 14,361 linear meters, and Region XII (SOCCKSARGEN) with 13,806 linear meters.. Note that although NCR has the least number of bridge across all regions (based on Table 9), its bridges are fairly long as these have an aggregate length of 30,321 linear meters (based on Table 10). The 2021 data also show that among the regions, Region IV-B (MIMAROPA) is the most in need of improvement from temporary bridges to permanent bridges given that it has the highest number and longest total length of temporary bridges.

Table 10. Regional distribution of national bridges, by length (linear meters) and material, 2021

Region	Length of Concrete Bridges (m)	Length of Steel Bridges (m)	Length of Bailey Bridges (m)	Length of Timber Bridges (m)	Total
CAR	7,153	7,124	84	0	14,361
NCR	28,859	1,462	0	0	30,321
Region I	23,772	10,705	0	0	34,477
Region II	21,248	7,203	38	0	28,490
Region III	29,850	8,194	0	0	38,043
Region IV-A	16,866	2,749	12	0	19,627
Region IV-B	19,660	3,312	363	35	23,370
Region V	18,595	3,980	0	0	22,575
Region VI	25,397	10,091	20	0	35,507
Region VII	18,368	5,452	0	0	23,820
Region VIII	25,898	9,570	264	93	35,825
Region IX	10,747	3,627	0	0	14,374
Region X	13,252	4,250	59	0	17,560
Region XI	11,400	3,620	128	0	15,148
Region XII	11,869	1,904	34	0	13,806
Caraga	14,381	6,373	0	0	20,753
Total	**297,313**	**89,614**	**1,001**	**128**	**388,057**

Note: The 2021 figures are as of November 4, 2021 and exclusive of BARMM. The source DPWH dataset does not include BARMM.

Source: DPWH (2021).

Table 11 below presents the bridge condition in the regions, based on the rating categories described above. The regions with the most number of bridges rated as "Good" are Region III (503 bridges), Region IX (476 bridges), and Region VIII (362 bridges). On the other hand, the most number of bridges with "Bad" rating can be found in Region II (16 bridges), Region IX (11 bridges), and Region VI (9 bridges).

Table 11. Bridge condition per region (number of bridges), 2021

Region	Good	Fair	Poor	Bad	Total
CAR	153	174	16	1	344
NCR	99	191	11	2	303
Region I	309	239	13	0	561
Region II	274	186	24	16	500
Region III	503	214	23	3	743
Region IV-A	301	336	28	7	672
Region IV-B	233	355	47	4	639
Region V	147	167	7	6	327

Region	Good	Fair	Poor	Bad	Total
Region VI	293	312	76	9	690
Region VII	335	402	31	5	773
Region VIII	362	200	16	1	579
Region IX	476	373	39	11	899
Region X	268	142	8	5	423
Region XI	138	161	6	3	308
Region XII	206	117	7	0	330
Caraga	264	169	20	2	455
Grand Total	**4,361**	**3,738**	**372**	**75**	**8,546**

Note: The 2021 figures are as of November 4, 2021 and exclusive of BARMM. The source DPWH dataset does not include BARMM.

Source: DPWH (2021).

2.2.3. Railways

The development of the country's rail transport sector stagnated for decades. From more than a thousand-kilometer railway length in the 1970s, the regularly operating railway length shrunk drastically to 77 km. in 2016. It is only in recent years that a more aggressive asset buildup is being pursued through new investments and reopening of old routes. By 2021, the total length increased to 395 km. The currently operating rail networks are the PNR network covering three operating sections, namely, PNR Metro Commuter Line, PNR Inter-Provincial Commuter Line, and PNR Bicol Commuter Line (see Figure 7), and the Metro Manila mass rail transit system consisting of the LRT-1, LRT-2, and MRT-3 lines (see Figure 8).

PNR network

The PNR, a government-owned and controlled corporation, owns and operates a commuter line in Metro Manila and the long-haul rail network outside the metropolis. The PNR Metro Commuter Line stretches from Manila to Calamba and consists of a total of 75.734 km. operational route length. As of October 2022, its Metro South Commuter service runs regular services between Tutuban (Manila) and Alabang (Muntinlupa), a late evening schedule from Tutuban to Calamba (Laguna), and an early morning schedule from Calamba to Tutuban. Its Metro North Commuter service runs regular services between Governor Pascual (Malabon) and Tutuban (PNR 2022).

The PNR Inter-Provincial Commuter Line is a newly reopened line. It ceased operating in 2013, then a portion of it, particularly the 44-km. San Pablo (Laguna)-Lucena (Quezon) route, reopened on June 26, 2022 (PNR 2022). On October 6, 2022, the reopened section in Laguna was further extended from San Pablo to Calamba. The total running time in the whole stretch of the Calamba-Lucena route is 2 hours and 33 minutes (GMA News 2022).

The PNR Bicol Commuter Line operates in the Bicol region and the currently operational service is the Sipocot-Naga route consisting of 37.07 km. of railway length (PNR 2022).

Figure 7. The Philippine National Railways system

Note: The whole stretch from Manila to Legaspi is 478 km. long but some routes are not operational. The operational routes are from Governor Pascual station (near Caloocan in the map) to Calamba for the PNR Metro Commuter Line, from Calamba to Lucena for the PNR Inter-Provincial Commuter Line, and from Sipocot to Naga for the PNR Bicol Commuter Line.

Source: PNR (n.d.)

Table 12 shows the recent performance of the PNR trains in terms of number of trips and number of carried passengers. The data show a decline in the number of train trips along the Metro North service route from 2020 to 2021, implying trip cancellations. Moreover, although the number of train trips increased in both the Metro South and Bicol service routes, the absolute number of passengers and the average number of passenger-trips declined, suggesting that commuters found better alternatives to the PNR trains as pandemic-related mobility restrictions were gradually removed.

Table 12. Number of PNR train trips and number of carried passengers, 2020-2021

Type of Service (Commuter)	Number of Train Trips		Number of Carried Passengers		Average Number of Passengers Per Trip	
	2020	2021	2020	2021	2020	2021
Metro South	10,551	11,706	3,879,923	3,081,424	368	263
Metro North	6,334	5,268	902,139	492,417	142	93
Bicol	1,793	1,797	284,066	224,242	158	125
Total	18,678	18,771	5,066,128	3,798,083	271	202

Note: The Laguna-Quezon Inter-Provincial Commuter Line is not included because it re-opened only in 2022.
Source: Commission on Audit (2022).

There is no available assessment of arrival performance and departure performance factors[10] for the PNR trains but news articles over the years show that commuters suffer poor service due to congestion, poor quality and unsafe railway platforms, train delays, and trip cancellations. The delays and cancellations sometimes happen without announcement. Reasons for the delays and cancellations include signaling problems, presence of garbage on rail tracks, and derailment.[11] There is no official assessment of how these incidents affect overall commuter experience but the suffering endured by commuters can be gleaned from their retelling in news reports of their daily life as a PNR commuter.[12]

Metro Manila mass rail transit systems

Within Metro Manila, the government through the Light Rail Transit Authority (LRTA)[13] owns two urban rails systems, LRT-1 (Green Line) and LRT-2 (Blue Line).[14] LRT-1 is under an operation and maintenance contract with the private Light Rail Manila Corporation (LRMC), which is also contractually obliged to extend the line southwards, while LRT-2 is being operated by the LRTA. LRT-1 has 20 stations and runs along 19.65 km. of route with a general north-south direction, while LRT-2 has 13 stations and runs along 17.6 km. of route with a general east-west direction.

The third urban rail system in Metro Manila, the MRT-3 (Yellow Line), is being operated by the government but it is owned by the private Metro Rail Transit Corporation (MRTC). The facility was built by the MRTC and leases it to the government through a build-lease-transfer contractual arrangement that will end in 2025. Metrostar Express,[15] a unit under the DOTr, is the actual operator. MRT-3 generally runs in a north-south direction and has 13 stations stretched along 16.9 km. of route.

[10] Arrival performance factor measures how closely the train sticks to the promised arrival schedule of arrival to a station and departure performance factor measures how closely the train sticks to the promised departure schedule from a station.

[11] Examples of commuter experiences as revealed in news articles are as follows:

Leonen, J. 2018. PNR railroad train derails after leaving Paco station, *Philippine Daily Inquirer*, March 24. https://newsinfo.inquirer.net/977797/breaking-pnr-railroad-train-derails-after-leaving-paco-station-transportation-pnr-train-derail.

Elemia, C. 2019. Poor National Railways? Thousands suffer as PNR cancels 713 trips in only 2 months, *Rappler*, March 11. https://www.rappler.com/newsbreak/investigative/225369-philippine-national-railways-trip-cancellations-january-february-2019/.

Cordero, T. 2020. PNR service delay caused by garbage dumped on rails —official, *GMA News*, June 2. https://www.gmanetwork.com/news/topstories/nation/740848/pnr-service-delay-caused-by-garbage-dumped-on-rails-official/story/.

Mallari, D. 2020. Derailed PNR train snarls traffic in Gumaca, Quezon, *Philippine Daily Inquirer*, October 17. https://newsinfo.inquirer.net/1349097/pnr-train-derailed-snarls-traffic-in-gumaca-quezon

GMA News. 2022. Some PNR trips delayed due to 'derailment incident' in Sta. Mesa, Manila, November 2. https://www.gmanetwork.com/news/topstories/metro/850045/some-pnr-trips-delayed-due-to-derailment-incident-in-sta-mesa-manila/story/.

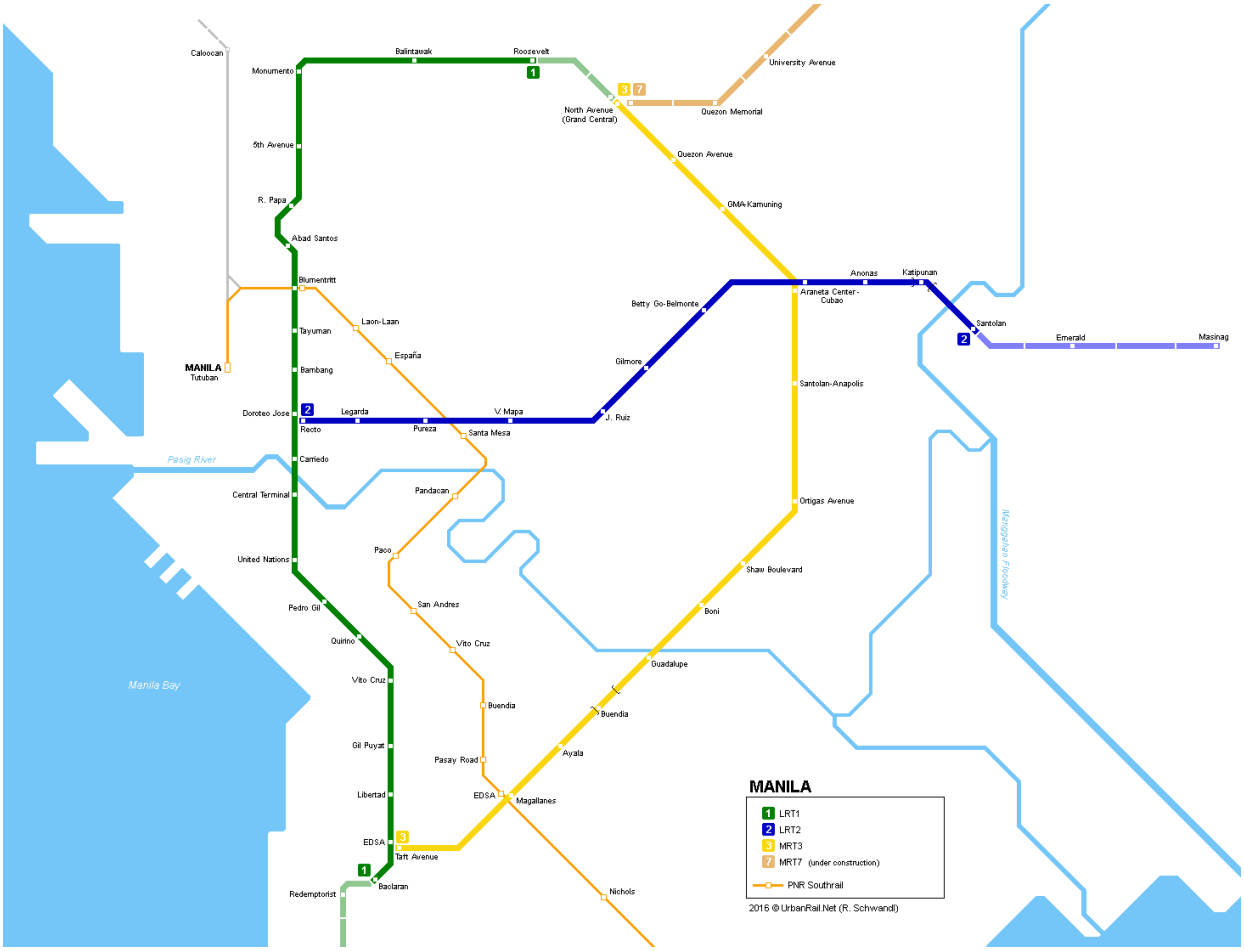
[12] See, for example, Jaena, D. 2019. Enduring the PNR commute, *Philippine Daily Inquirer*. December 12. https://opinion.inquirer.net/125826/enduring-the-pnr-commute.

[13] A government corporation attached to the DOTr.

[14] Although the systems are named light rail transit, they have characteristics of a rapid transit system.

[15] Metrostar is not a government corporation but an operating unit that has no financial autonomy. It remits its revenues in full to the treasury and funds its operating expenses through an annual budget from the national government.

Figure 8. Metro Manila mass rail transit service map



Note: Apart from the LRT-1, LRT-2, and MRT-3, the map shows a portion of the PNR system that traverses Metro Manila and a portion of the MRT-7 that is under construction as of 2022.

Source: urbanrail.net (n.d.)

Table 13 below shows the passenger traffic carried on the three Metro Manila mass rail transit lines, from 2010 to 2021 for LRT-1 and LRT-2 and from 2010 to 2020 for MRT-3 and as gathered from various sources. The data show declines in passenger traffic in years immediately preceding the pandemic and during the pandemic. However, traffic carried by MRT-3 and LRT-2 started to increase in 2021 and 2022, respectively.

Table 13. Passenger traffic in Metro Manila mass rail transit lines (in millions)

	LRT-1	LRT-2	MRT-3
2011	156.9	63.8	158.8
2012	170.7	70.3	174.5
2013	171.8	71.4	176.1
2014	170.7	72.8	167.8
2015	141.4	62.4	118.2
2016	147.9	67.0	133.9
2017	157.0	66.0	140.1
2018	165.2	64.7	104.2
2019	161.3	57.0	97.2
2020	50.6	12.5	31.9
2021	44.40	11.84	45.7
2022	n.d.	27.83	98.3

	LRT-1	LRT-2	MRT-3
2011	156.9	63.8	158.8
2012	170.7	70.3	174.5
2013	171.8	71.4	176.1
2014	170.7	72.8	167.8
2015	141.4	62.4	118.2
2016	147.9	67.0	133.9
2017	157.0	66.0	140.1
2018	165.2	64.7	104.2
2019	161.3	57.0	96.3
2020	50.6	12.5	31.5
2021	44.40	11.84	n.d.
2022	n.d.	27.83	n.d.

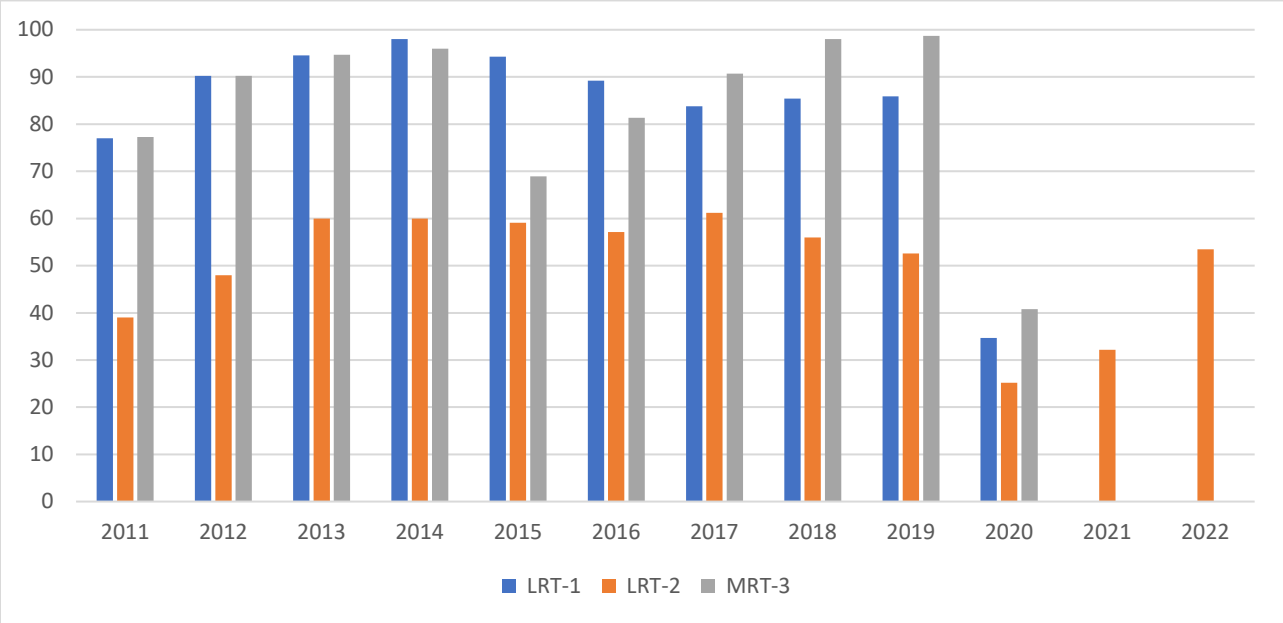
Notes: n.d. = no data.

The Philippine Statistical Yearbook 2021 (Philippine Statistics Authority (PSA) 2021a) has LRT-1, LRT-2, and MRT-3 data up to 2020. To supplement, the following data sources were tapped: *Statista* (statista.com, which has data on the private company LRMC) for LRT-1 2021 data; LRTA Key Performance Indicators webpage for LRT-2 data for 2021 and 2022; and Metrostar Express 2019 to 2022 daily ridership reports for the MRT-3 2019 to 2022 data.

Sources: DOTr -Metrostar Express (2022); PSA (2021a); LRTA (2022); Statista (2022).

The load factor[16] data reveals severe rail congestion in LRT-1 and MRT-3. In assessing load factor, we can use as benchmark the target average load factor of 60 percent as used in Japanese International Cooperation Agency (JICA)-funded studies on urban rail transit systems (e.g., ALMEC Corporation 2014). Given this benchmark, we can see from Figure 9 below that the LRT-1 and the MRT-3 exhibited above 60 percent load factors in most years and the LRT-2 also started to exhibit load factors of above 60 percent before the pandemic years of 2020-2021. This only confirms the commuters' grueling experiences of congestion and long queues.[17]

Figure 9. Load factor in Metro Manila mass rail transit lines, 2011 to 2022 (in percent)



Notes: The data are incomplete because there are gaps in the published source. The Philippine Statistical Yearbook 2021 (PSA 2021a) has LRT-1, LRT-2, and MRT-3 data up to 2020 only. As noted in the report, the 2020 data are only an average of January to March and June to December monthly values. MRT-3 data has missing entries for 2015 and 2016, which were filled in by data from the 2019 iteration of the Yearbook. LRT-2 entries were augmented with 2021 and 2022 data from the LRTA Key Performance Indicators webpage.

Sources: PSA (2019, 2021a); LRTA (2022).

[16] Load factor measures the capacity utilization of transport services like railways.

[17] See, for example:
Morallo, A. A year of battling through traffic and train queues, July 5, 2017, *PhilStar*. https://www.philstar.com/headlines/2017/07/05/1714153/year-battling-through-traffic-and-train-queues.
Piad, T. Commuters' nightmare returns: Long lines for zero to few rides, July 19, 2022, *Philippine Daily Inquirer*. https://inqmobility.com/2022/07/19/public-transport/commuters-nightmare-returns-long-lines-for-zero-to-few-rides/.

2.2. Comparison with other ASEAN countries

Recent global competitiveness assessment data show that the Philippines is still lagging behind most of its peers in Southeast Asia with respect to overall state of infrastructure. The Global Competitiveness Index (GCI) ranking conducted by the World Economic Forum through its *The Global Competitiveness Report* series shows this.

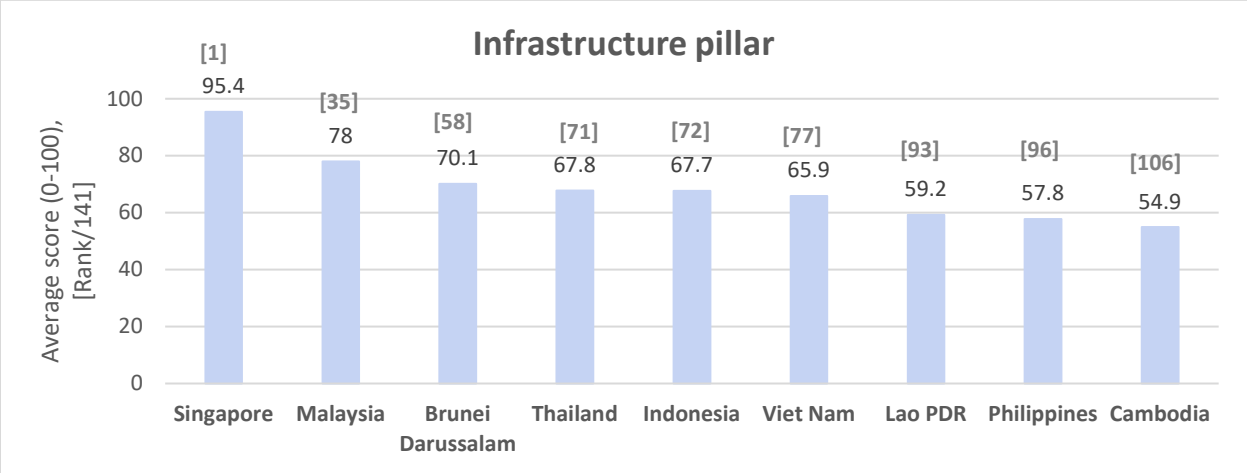
The GCI uses 103 indicators and thirty percent of the indicators being assessed are derived from the Executive Opinion Survey being administered by the World Economic Forum through partner institutes. The latest available rankings are in *The Global Competitiveness Report 2019*[18] for 141 economies, which account for 99 percent of the global GDP. The GCI, which is now on its version 4 (called GCI 4.0), looks at factors that determine productivity given the premise that the most important determinant of long-term economic growth is productivity increase. In the GCI framework, infrastructure is one of the 12 "pillars" or main drivers of global competitiveness. The other pillars are institutions, information and communication technology (ICT) adoption, macroeconomic stability, health, skills, product market, labor market, financial system, market size, business dynamism, and innovation capability.

The GCI framework breaks down the 12 pillars further into sub-pillars. The sub-pillars of the infrastructure pillar are transport and utilities, which in turn are described by quantity and quality indicators. There are eight indicators under the transport infrastructure sub-pillar, namely, road connectivity, quality of road infrastructure, railroad density, efficiency of train services, airport connectivity, efficiency of air transport services, liner shipping connectivity, and efficiency of seaport services. There are four indicators under the utility infrastructure sub-pillar, namely, electricity access, electricity supply quality, exposure to unsafe drinking water, and reliability of water supply (World Economic Forum 2019).

Using the infrastructure pillar rankings in *The Global Competitiveness Report 2019* as indicator, a comparison of the state of infrastructure across the members of the Association of Southeast Asian Nations (ASEAN) can be made. As can be seen in Figure 8, the Philippines is showing a poor ranking in infrastructure competitiveness because it is second from the bottom or the second worst-ranked country among the nine countries included in the ranking. (Myanmar is not included in *The Global Competitiveness Report 2019*.) Compared with the 141 economies that are included in the report, the Philippines has an overall rank of 96th in infrastructure competitiveness and has an average score of 57.8 (on a scale of 0 to 100). The score for the infrastructure pillar is the average of the scores for the transport and utility infrastructure sub-pillars.

[18] Although the latest *Global Competitiveness Report* is *The Global Competitiveness Report Special Edition 2020: How Countries are Performing on the Road to Recovery*, it does not contain rankings on the Global Competitiveness Index given that its focus is on readiness for transformation after the pandemic. The International Institute for Management Development (IMD), a business school in Switzerland, released a more recent cross-country comparison through its *IMD World Competitiveness Booklet 2022* but for a smaller set of countries only, 64 countries. Among the Philippines' peers in the ASEAN, only Indonesia, Malaysia, Singapore and Thailand are included in the IMD report. Moreover, the road and rail dataset is not as informative as the one in *The Global Competitiveness Report 2019* because only two indicators are included—namely, density of the road network and density of the railroad network.

Figure 10. ASEAN rankings in the infrastructure pillar of the Global Competitiveness Index

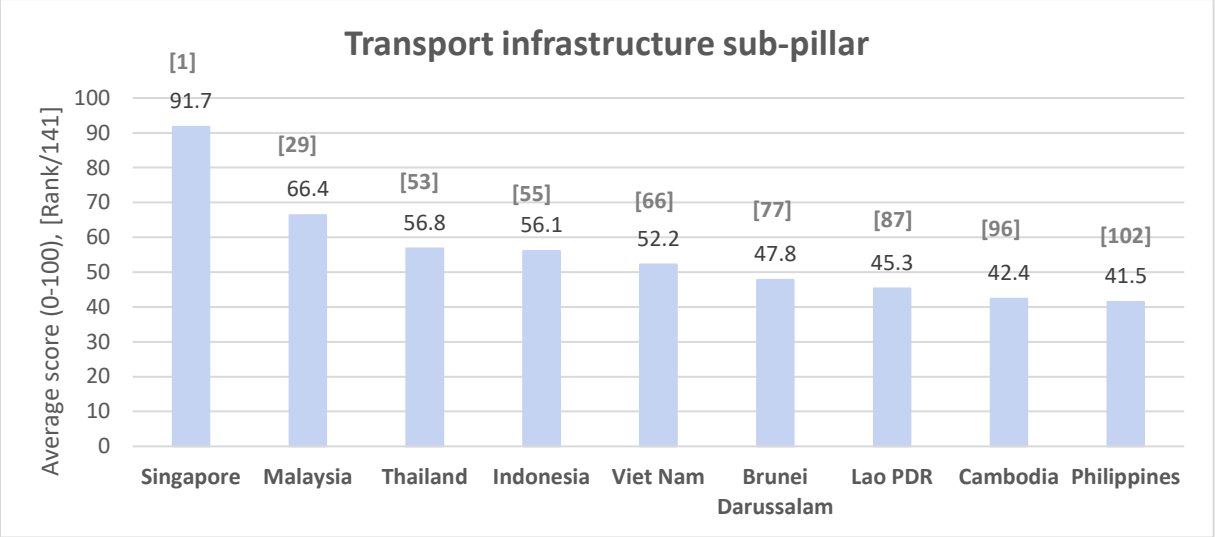


Note: The numbers in brackets are the ranks of the countries in the global ranking of 141 economies and the numbers below the ranks are the averages of the scores for the transport and utility infrastructure sub-pillars.

Source: World Economic Forum (2019)

In the transport infrastructure sub-pillar, the Philippines is at the bottom in the ASEAN ranking (see Figure 8). The Philippines has a score of 41.5, the average of its scores in the eight indicators of transport infrastructure competitiveness. Globally, it is ranked 102nd among 141 economies.

Figure 11. ASEAN rankings in the transport infrastructure sub-pillar of the Global Competitiveness Index

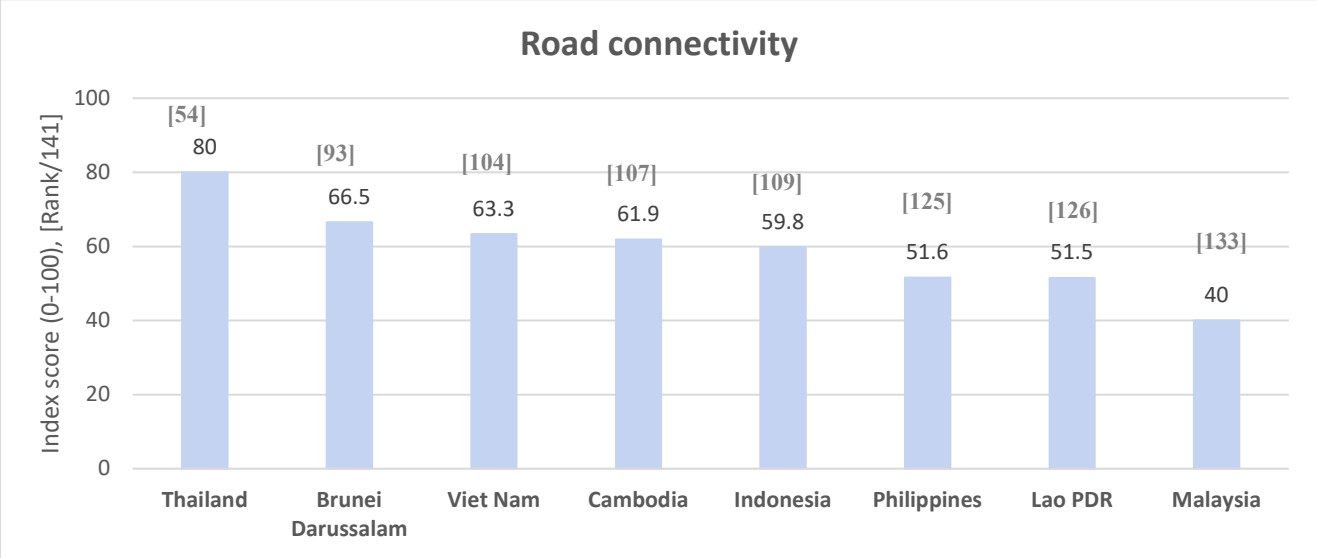


Note: The numbers in brackets are the ranks of the countries in the global ranking of 141 economies and the numbers below the ranks are the averages of the scores for the transport infrastructure sub-pillar.

Source: World Economic Forum (2019)

Among the eight indicators under the transport infrastructure sub-pillar, the details of the rankings and scores for four indicators, namely, road connectivity, quality of road infrastructure, railroad density, and efficiency of train services, can be used to make a cross-country comparison on road and rail infrastructure. Among the eight ASEAN countries included in the ranking, the Philippines is ranked third from the bottom with respect to road connectivity (see Figure 9). It has a score of 51.6 and is ranked 125th among 141 economies.

Figure 12. ASEAN rankings in road connectivity

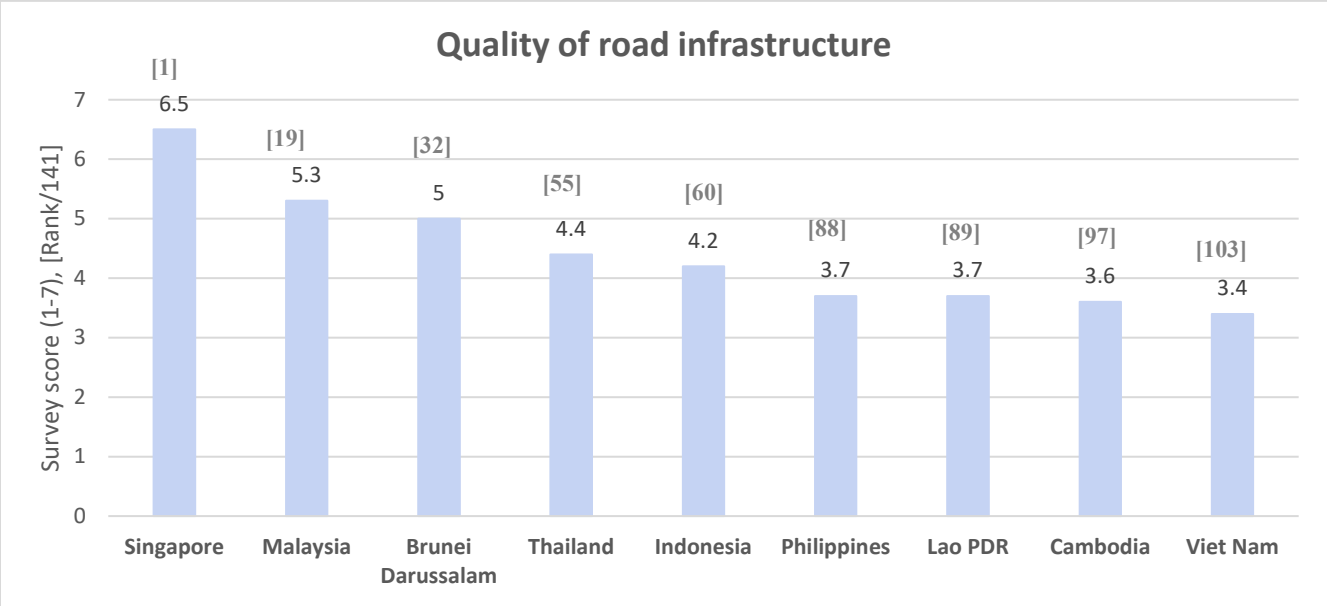


Note: The score on the road connectivity index rates two elements: first, the average speed of a driving itinerary connecting an economy's 10 or more largest cities accounting for at least 15% of the economy's total population; and second, the road straightness in the itinerary. Road straightness corresponds to the ratio of the sum of driving distances between each city to the sum of "crow-fly distances" (i.e., distance measured in a straight line) between each city in the itinerary. Evidently, the road connectivity indicator is not applicable to Singapore and thus, Singapore is not included in the ranking in this aspect.

Source: World Economic Forum (2019)

On the quality of road infrastructure, the Philippines again ranked low as it is sixth among the nine ASEAN countries included in the ranking, or fourth from the bottom (see Figure 10). Its score of 3.7 is 88th among 141 economies.

Figure 13. ASEAN rankings in quality of road infrastructure

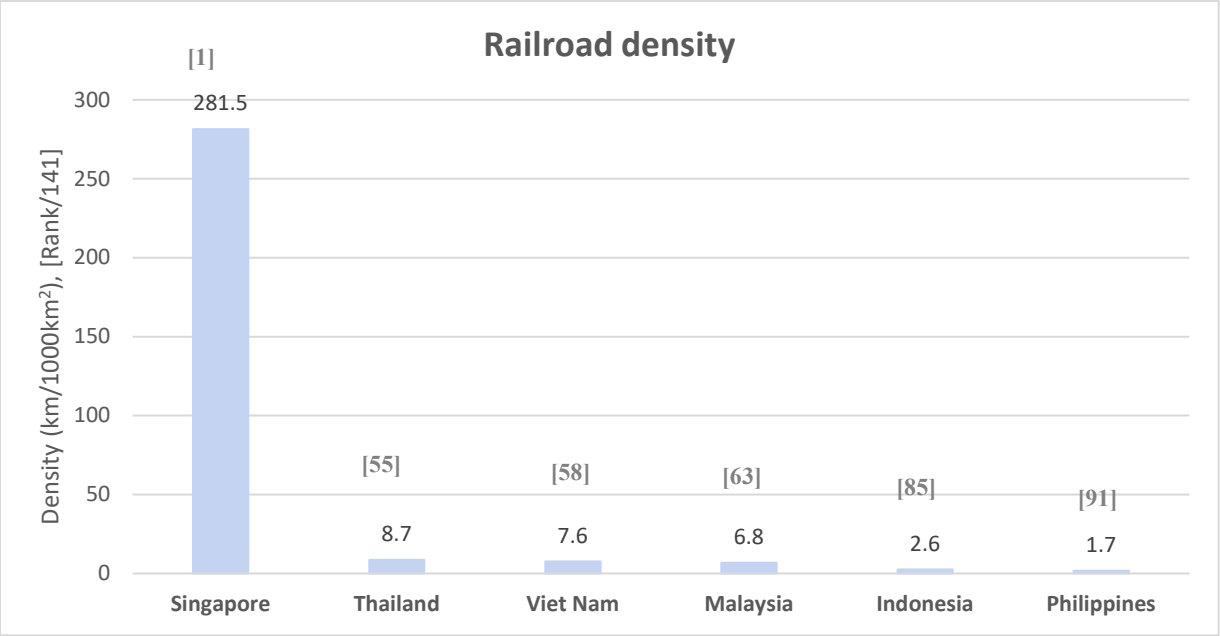


Note: The scores on the quality of road infrastructure is in answer to the Executive Opinion Survey question "In your country, what is the quality (extensiveness and condition) of road infrastructure?" Scores range from "1" for extremely poor, or among the worst in the world, to "7" for extremely good, or among the best in the world. The final scores are either the 2018-2019 weighted average or most recent period available. The WEF placed more weight on the year with the larger sample size and attributed greater weight to the most recent sample (see page 634 of the WEF's Global Competitiveness Report 2019 for the weighting).

Source: World Economic Forum (2019)

With respect to railroad density, the indicator is km. of railroad per 1,000 sq. km. of land and there are six ASEAN countries where the indicator is applicable. Among the six, the Philippines is at the bottom of the ranking (see Figure 11). The Philippines' global ranking is 91st given its railroad density of 1.7 km. of railroads per 1,000 sq. km. of land.

Figure 14. ASEAN rankings in railroad density

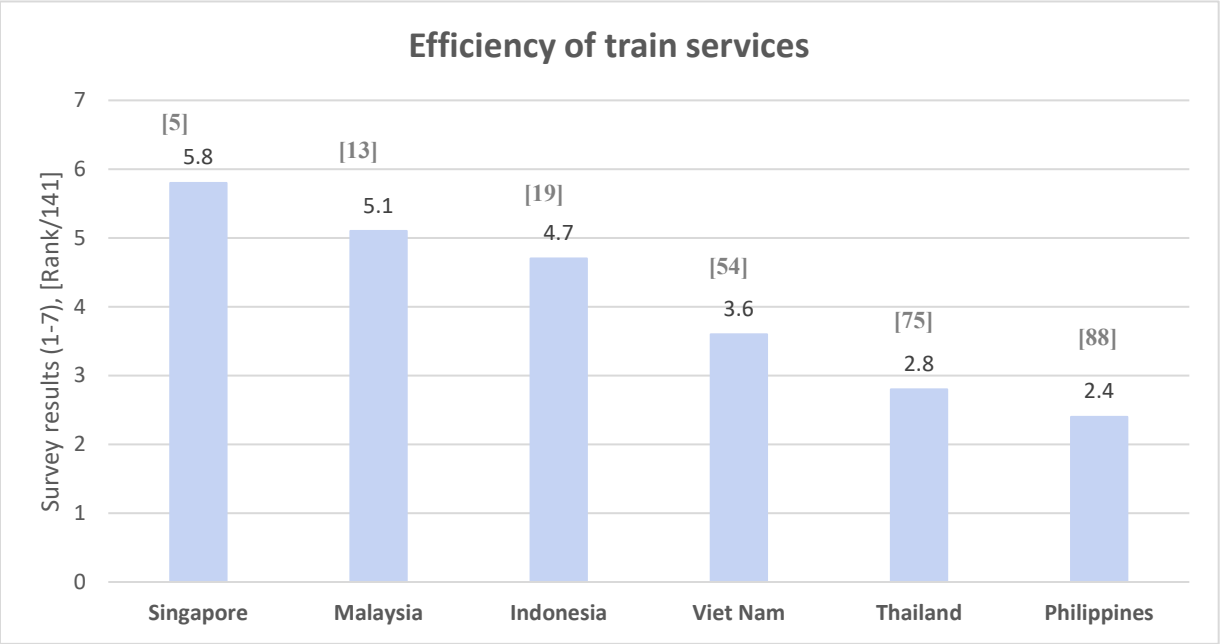


Notes: For the countries' km. of railroad per 1,000 sq. km. of land, the primary data sources are the World Development Indicators database of The World Bank Group and national sources. Given the definition, the indicator is not applicable to Brunei Darussalam, Lao People's Democratic Republic, Cambodia, and Myanmar.

Source: World Economic Forum (2019)

For the same six ASEAN countries, the report also rated the efficiency of train services and the Philippines is again at the bottom in the ranking (see Figure 12). The Philippines' score is 2.4 on a scale of 1 (among the worst) to 7 (among the best) and it is 88th in the world.

Figure 15. ASEAN rankings in efficiency of train services



Note: The scores on the efficiency of train services is in answer to the Executive Opinion Survey question "In your country, how efficient (i.e., frequency, punctuality, speed, are train transport services?" Scores range from "1" for extremely inefficient, or among the worst in the world, to "7" for extremely efficient, or among the best in the world. The final scores are either the 2018-2019 weighted average or most recent period available. The WEF placed more weight on the year with the larger sample size and attributed greater weight to the most recent sample (see page 634 of the WEF's *The Global Competitiveness Report 2019* for the weighting).

Source: World Economic Forum (2019)

As shown through various indicators above, benchmarking against ASEAN neighbors validates what users of road and rail transport infrastructure in the Philippines have long been experiencing–deficient and inferior infrastructure. That the Philippines still has much to catch up on in improving the quantity and quality of its road and rail transport infrastructure justified the massive infusion of public investments on infrastructure in previous administrations, with the target set at five percent of GDP in the 2010-2016 development planning period and then raised to seven percent of GDP in the 2017-2022 development planning period. As the recent accomplishments in the infrastructure public investment program has not yet been considered in the 2019 GCI rankings used above, responsible government agencies can repeat the benchmarking demonstrated in this study when the next iteration of the GCI comes out. The results will surely be useful to policymakers and decision makers.

3. Planning, programming and spending targets vis-a-vis achievements

In this section, we review the progress in achieving the targets in the rail and road transport infrastructure program with consideration for planning-programming-budgeting-implementation linkages. The discussion below explains what targets were set by the government in the planning, investment programming, and expenditure programming documents. It also examines, based on available data, what have been achieved as the expenditure programs got implemented.

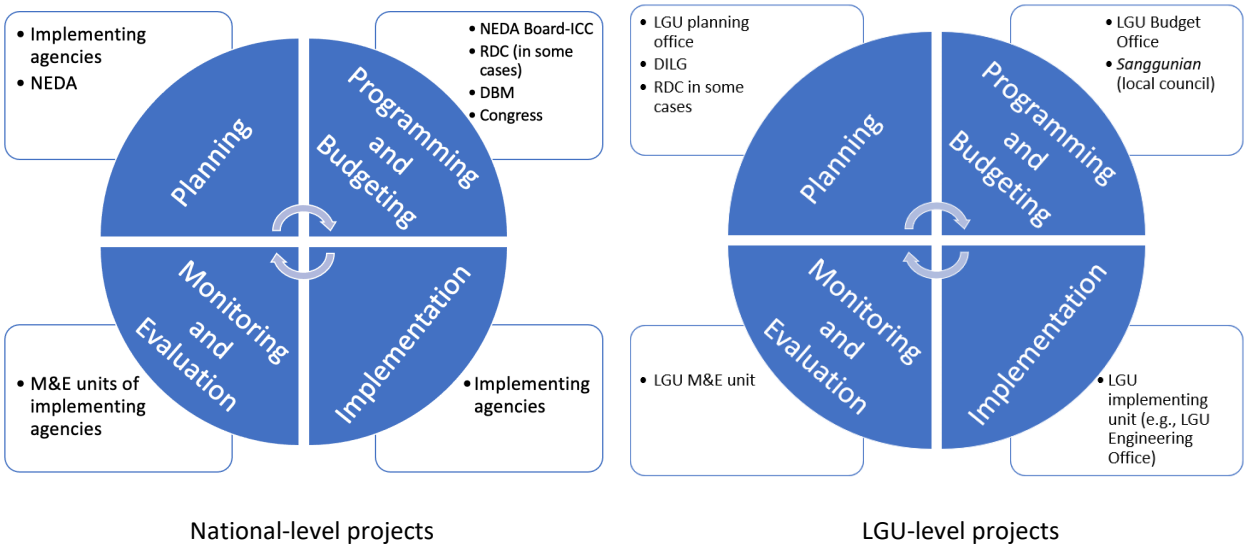
3.1. Planning-programming-budgeting-implementation linkages

Figure 16 below illustrates the desirable program or project cycle as an inter-linked stages of planning, programming, budgeting, implementation, and monitoring and evaluation stages. Whether what is being pursued is the achievement of sectoral objectives or specific project objectives, everything starts with planning. Road and rail sectoral plans contained in the Philippine Development Plan are prepared through the leadership of the NEDA with inputs from implementing agencies such as the DPWH and the DOTr. At the local government unit (LGU) level, the infrastructure plan is formulated as a component of the LGU Comprehensive Development Plan, one of the plans mandated under the Local Government Code. The LGU planning office is primarily in charge of this, with oversight from the DILG. Consultations with the Regional Development Council (RDC) is required if the plans involve the cooperation of two or more provinces.

The targets and the strategies in the development plans are then translated to investment programs, more specifically public investment programs, or the project "wish list" of every administration whether at the national or LGU level. At the national level, the heads of implementing agencies are responsible for approving projects that are less than PHP2.5 billion. Projects worth PHP2.5 billion[19] or more have to go through various levels of approval, first by the Investment Coordinating Committee (ICC), a committee under the NEDA Board, and then by the NEDA Board itself. In some cases, when the ICC determines that a project needs RDC endorsement as a condition for the ICC's full approval, the concerned RDC reviews the proposed project. The approved national government projects are then consolidated by the DBM and become part of the President's proposed budget or the General Appropriations Bill, which the Congress deliberates on and, after some revisions, passes as the General Appropriations Act (GAA). The Congress-approved GAA becomes law after the approval by the President, who may exercise its right to veto certain items in the Congress-approved budget. At the LGU level, the programming is being performed within the LGU itself through the leadership of the local budget office. The local expenditure program has to be deliberated on and approved by the local council called *Sanggunian*. The local chief executive may veto items in the *Sanggunian*-approved budget and the *Sanggunian* in turn may override the veto of the local chief executive via two-thirds vote of all its members.

[19] There are exceptions to this threshold. As required by RA 7718, PPP projects with costs above PHP300 million should be elevated to the NEDA Board for approval and projects under the Build-Own-Operate scheme, regardless of amount, have to be approved by the President. Projects seeking national government borrowing or guarantee covered by RA 4860, as amended, and RA 8182, as amended, also have to go through ICC and NEDA Board approval.

Figure 16. Planning-programming-budgeting-implementation linkages



Source: Author's interpretation of existing practices

The budget execution then happens during the implementation stage. Some form of monitoring (e.g., construction monitoring in the case of civil works) is happening during the implementation stage but it is useful to highlight that monitoring and evaluation of project utilization and impacts can be a separate stage. Monitoring and evaluation should be conducted even after implementation has ended in order to provide feedback to the next cycle of planning for developmental objectives and interventions.

3.2 Targets and achievements

PDP targets and achievements

Recognizing that adequate and quality infrastructure is a foundation for sustainable development, the PDP 2017-2022 aimed to accelerate infrastructure development. The major strategy set by the PDP was to increase public infrastructure spending from a 2016 baseline of 5.1 percent of GDP to 7.4 percent of GDP by the end of the plan period (NEDA 2017, p. 19-14). The public investment programming and specific project identification by implementing agencies were then anchored on this major strategy.

In terms of desired results in the road and rail transport sectors, the first edition of the PDP 2017-2022 set the following quantitative targets:

Table 14. PDP 2017-2022 targets in the road and rail transport sectors

	Base year	Baseline value	End of plan target (2022)
Road Transport			
International Road Roughness Index in national primary roads achieved	2015	4.62	3.0
Rail Transport			
Optimal capacity in train systems achieved, in passengers per sq.m.			
Philippine National Railways	2015	6	6
(optimal capacity = 6 passengers per sq.m.)			
Light Rail Transit Line 2	2015	5	4 to 5
(optimal capacity = 4 to 5 passengers per sq.m.)			

Source: NEDA (2017, Chapter 19, p. 14).

The accomplishment of these targets, however, are not in the StatDev monitoring of the PSA. StatDev or Statistical Indicators on Philippine Development, is being maintained by the PSA to serve as an early warning measure by showing the likelihood of achieving the economic and social development goals set forth in the PDP. At the time of writing, the latest StatDev monitoring report is for the year 2021 accomplishments (PSA 2021c).

The international road roughness index (IRI) is being reported by the DPWH. The latest DPWH survey on IRI was in 2019 and it shows that the national average IRI deteriorated to 4.68 in 2019 (Table 15) relative to the baseline of 4.62 in 2015 (Table 14). Moreover, roads in the following regions have IRI scores that categorize them as being in "poor" condition (i.e., average IRI of greater than 5): Cordillera Administrative Region, Western Visayas, Zamboanga Peninsula, Davao, and SOCCSKSARGEN.

Table 15. Average international roughness index (IRI) per region in 2019

Region	Average
Cordillera Administrative Region	5.83
National Capital Region	4.91
Region I - Ilocos	3.75
Region II - Cagayan Valley	4.56
Region III - Central Luzon	3.63
Region IV-A - CALABARZON	3.34
Region V - Bicol	3.39
Region VI - Western Visayas	5.02
Region VII - Central Visayas	4.58
Region VIII - Eastern Visayas	4.63
Region IX - Zamboanga Peninsula	5.07
Region X - Northern Mindanao	4.31
Region XI - Davao	5.24
Region XII - SOCCSKSARGEN	5.16
Region XIII - Caraga	4.37
Nationwide Average	**4.68**

Notes:

1. Road quality classification based on average IRI:
   1 to 3 = road segment is in "good" condition
   greater than 3 up to 5 = road segment is in "fair" condition
   greater than 5 up to 7 = road segment is in "poor" condition
   greater than 7 = road segment is in "bad" condition

2. The DPWH Atlas webpage states that the data are as of 18 October 2021. However, given that the last roughness survey done according to the DPWH was in 2019, the reported indexes in the 2021 DPWH Atlas are essentially as of 2019.

3. The survey for IRI per region are for primary roads and Region IV-B is not included in the survey because it has no primary roads. BARMM is also not included because the baseline roughness data of BARMM is yet to be established. (In discussion with Mr. Ivan Noel C. delos Reyes of the Statistics Division, Planning Service, DPWH via email on December 27, 2021.)

Source: DPWH 2021.

On the targets on train system optimal capacity, the achieved values for the indicators mentioned in Table 14 are not being reported by the DOTr, the PNR, and the LRTA. Note also that for the PNR system, the target setting is not useful because it did not aim for improvement, that is, the 2015 baseline of 6 passengers per sq.m. is still the target for 2022. It is also evident that commuters' woes remain given the incidents on train delays, the reports on long queues and congestion, and the data on high load factors as discussed in Section 2.2.3.

The Updated PDP 2017-2022, which was supposedly a mid-term update of the plan but released late (in February 2021) due to the pandemic, revised the indicators and targets as follows:

Table 16. Updated PDP 2017-2022 targets in the road and rail transport sectors

	Base year	Baseline value	Targets			
			2020	2021	2022	End of Plan
Road Transport						
Travel time (decreased) via land per key corridor (in hours)						
Metro Manila	2016	2.97	3.12	3.11	3.11	3.11
N1/Pan-Philippine Highway (Laoag-Zamboanga)	2016	61.12	50.94	48.39	45.84	45.84
Manila-Baguio	2016	7.04	5.86	5.57	5.28	5.28
Manila-Pagudpud	2016	13.36	11.13	10.58	10.02	10.02
Manila-Cagayan	2016	12.11	10.09	9.59	9.08	9.08
Manila-Clark	2016	2.8	2.34	2.22	2.1	2.1
Clark-Subic	2016	2.09	1.75	1.66	1.57	1.57
Manila-Batangas	2016	3.46	2.88	2.74	2.6	2.6
Iloilo-Capiz	2016	2.62	2.18	2.07	1.96	1.96
Surigao-Davao	2016	7.1	5.92	5.62	5.33	5.33
Butuan-Iligan City	2016	5.8	4.83	4.59	4.35	4.35
Cagayan de Oro-Davao City	2016	5.7	4.75	4.51	4.27	4.27
Bacolod-Dumaguete-Bayawan	2016	8.46	7.05	6.7	6.35	6.35
Danao-Cebu-Santander	2016	4.61	3.85	3.65	3.46	3.46
Road traffic accident rate reduced (in number of accidents per 100,000 population) - incidents of accidents	2016	10.7	10	10	10	10
Rail Transport						
Passenger trips via rail in Metro Manila increased (in % share to total passenger trips via rail, cumulative)	2014	11	16	17	19	19

Note: N1 = National Route 1.

Source: NEDA (2021a, p. 325-326).

The targets for the road transport sector in the Updated PDP are reduction of travel times and reduction of road accidents, and the target for the rail transport sector is increased share of passenger trips via rail in Metro Manila. From Table 16 above, it can be easily calculated that the travel time targets for the mentioned key corridors except Metro Manila are simply 16 percent to 17 percent reduction in travel time from 2016 to 2020, 5 percent travel time reduction in 2021, and 5 percent travel time reduction in 2022. We note that this is a simplistic target-setting (as opposed

to systematic and rational target-setting that is backed by site-specific interventions that would result in variation in how travel times could be reduced per corridor). The PDP targets for the Metro Manila corridor are also unhelpful. From 2016 to 2020, the target for Metro Manila is oddly a 5 percent increase in travel time; the target for 2021 is an insignificant 0.3 percent decrease in travel time, and for 2022, no decrease in travel time. We note that this speaks of carelessness in planning sectoral developmental targets. As to accomplishments, the 2021 StatDev monitoring reported that the targeted travel times for the key corridors (except Metro Manila) were not achieved (Table 17 below).

On reduction of road traffic accidents, the StatDev monitoring does not have accomplishment figures. However, to start with, the baseline value of 10.7 accidents per 100,000 population in 2016 (Table 16) may have been underestimated given that the PSA OpenSTAT (PSA 2022) calculated that the road fatality rate per 100,000 population in 2016 was already high at 10.9. Note that this figure is for fatalities, a subset of accidents data. Hence, although the OpenSTAT reported a drop in fatality rate in 2020 at 8.0, it is not a clear indication that the PDP targets were met because it is not representative of all road traffic accidents.

It is also unlikely that the PDP targets have been met given that the traffic vehicular accident-related injury figures in the Department of Health (DOH) Online National Electronic Injury Surveillance System (ONEISS) are high. Note that the ONEISS dataset consists only of injuries reported to hospitals and infirmaries nationwide and does not capture all traffic-related accidents (given that some of these accidents do not involve injuries). In 2021, the ONEISS reported a total of 30,763 injuries the cause of which were transport vehicular accidents (DOH 2022). Given the 110,198,654 projected population in 2021 (PSA 2021b), the indicator "injury due to traffic vehicular accidents per 100,000 population" (which is a subset of the indicator “accidents per 100,000 population”) can be estimated as 27.92. This further suggests that the PDP target of 10 accidents per 100,000 population in 2021 was not achieved.

Table 17. Achievement of travel time targets in key road corridors (in hours), 2020-2021

		Targets		Accomplishments	
	Baseline value (in 2016)	2020	2021	2020	2021
Road Transport					
Travel time (decreased) via land per key corridor (in hours)					
N1/Pan-Philippine Highway (Laoag-Zamboanga)	61.12	50.94	48.39	64.53	62.40
Manila-Baguio	7.04	5.86	5.57	6.97	6.23
Manila-Pagudpud	13.36	11.13	10.58	12.52	11.98
Manila-Cagayan	12.11	10.09	9.59	13.11	12.55
Manila-Clark	2.8	2.34	2.22	3.04	2.45
Clark-Subic	2.09	1.75	1.66	2.38	2.28
Manila-Batangas	3.46	2.88	2.74	3.22	3.02
Iloilo-Capiz	2.62	2.18	2.07	2.49	2.48

	Baseline value (in 2016)	Targets		Accomplishments	
		2020	2021	2020	2021
Surigao-Davao City	7.1	5.92	5.62	7.37	7.60
Butuan-Iligan City	5.8	4.83	4.59	5.79	5.94
Cagayan de Oro-Davao City	5.7	4.75	4.51	5.40	6.32
Bacolod-Dumaguete-Bayawan	8.46	7.05	6.7	8.34	7.98
Danao-Cebu-Santander	4.61	3.85	3.65	5.06	4.49

Source: PSA (2021c).

There is also no StatDev reporting of the achievement of the Updated PDP target for the rail transport sector, that is, increase in the share of passenger trips via rail in Metro Manila (Table 16). It is likely, however, that the target has not been met given that passenger traffic carried by the existing three Metro Manila rapid rail transit lines have been declining in recent years, as shown in Section 2.2.3 earlier. Discounting the fact that there were pandemic-related mobility restrictions in 2020 to 2021, the declining trend is still apparent. Table 13 in Section 2.2.3 shows that the declines started before the pandemic: the LRT-2 and the MRT-3 traffic declines started in 2018, and the LRT-1 traffic decline started in 2019.

In terms of policy targets, the PDP 2017-2022 (both the first edition and the updated edition) pushed for the enactment of a National Transport Policy and the creation of an independent regulatory body for railways (along with independent regulatory bodies for airports and seaports). But these policy targets were not achieved. With respect to the National Transport Policy, what was achieved was the issuance on September 12, 2017 of a NEDA Board resolution adopting such policy. The IRR for it was approved on December 14, 2018 and was supposed to take effect 15 days after publication in the Official Gazette and in a newspaper of general circulation. But strangely, the IRR was published only on December 30, 2019, more than a year after its approval. The IRR took effect on January 14, 2020. With respect to enacting a law creating an independent regulator for the railway sector, this was also not achieved. But Executive Order (EO) 96, series of 2019, was issued and created a Railways Institute as an interim solution for the training and regulation of human resources in the railway sector. The EO specifically aims to address the need to ensure that personnel have the necessary competence and comply with standards on the safe operation and maintenance of railways.

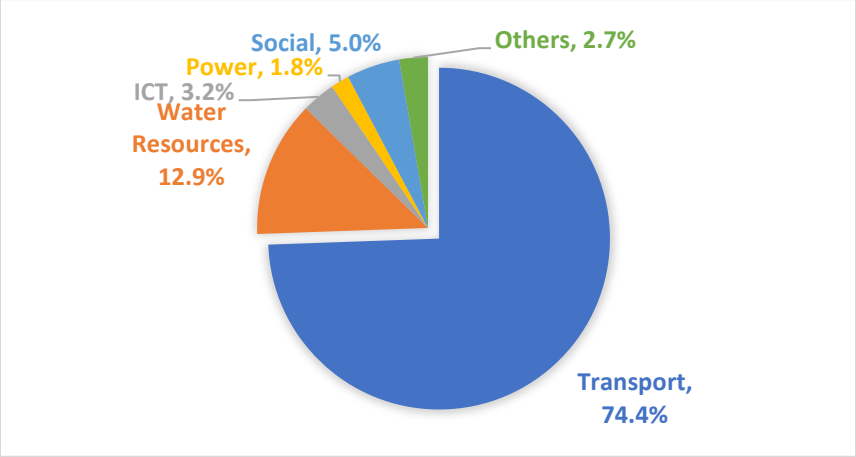
The PDP 2017-2022 also promised efficient coordination among government agencies and stakeholders and explicitly articulated regarding road projects that "there will be greater coordination among DPWH, telecommunication companies, WDs [water districts], electric cooperatives or distribution companies on projects, particularly on road widening that requires the transfer of affected utility lines" (NEDA 2017, p. 19-19). However, there are numerous cases of

road expansion projects being completed with the utility posts still left standing on the roads and posing as safety hazards to vehicles.[20]

Evolution of the public investment program

To realize the developmental objectives established in the PDP, projects have to be programmed over the plan period and these are contained in a document called the Public Investment Program (PIP) 2017-2022. The programmed investments in the PIP 2017-2022 are organized by PDP thematic chapters and at the start of the plan period, the total programs corresponding to infrastructure (Chapter 19 of the PDP) consisted of 7,816 projects with a total cost of PHP7,380 billion. In the 2021 update of the PIP, the infrastructure investment program consisted of 5,586 projects with a total cost of PHP3,123 billion (NEDA 2021b). Among the infrastructure sectors, the transport sector had the highest share (74 percent) in the infrastructure investment program (Figure 17). (The shares of the road and rail transport sub-sectors in the infrastructure investment program, however, are not readily available.[21])

Figure 17. Philippine public investment program for infrastructure 2017-2022, by sectoral shares



Notes: ICT - information and communication technology
Others - include urban/heritage renewal projects, government buildings, and multi-purpose facilities.

Source: NEDA. 2021b.

[20] See for example:

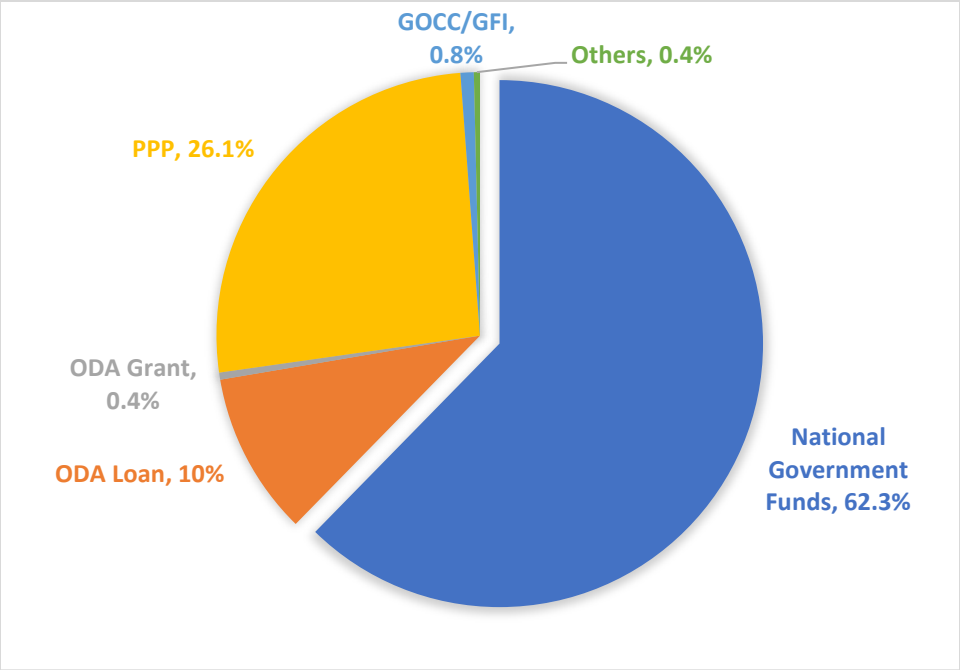
Manahan, J. 2020. 'Lack of coordination': Around 60,000 electric poles cause road obstruction nationwide, Gatchalian says, *ABS-CBN News,* November 19. https://news.abs-cbn.com/news/11/19/20/lack-of-coordination-around-60000-electric-poles-cause-road-obstruction-nationwide-gatchalian-says.

Menianao, S. 2022. Over 8K power poles block roads in Eastern Visayas, *Philippine News Agency*, November 11. https://www.pna.gov.ph/articles/1188329

[21] The authors attempted to request for these from the NEDA but the database given by the NEDA to the authors lacked codes for the sub-sectors of the transport sector. As there are 5,586 infrastructure projects in the database, figuring out the subsector categorization based on the project titles alone would have been very time-consuming and the unofficial categorization would have been prone to errors.

The total public investment program for infrastructure by source of financing is depicted in Figure 18. Note that majority of the projects are financed using national government funds.

Figure 18. Philippine public investment program for infrastructure 2017-2022, by source of financing



Notes: GFI - government financing institution
GOCC - government-owned and controlled corporation
ODA - official development assistance
PPP - public-private partnership
Others - include internally generated income of state universities and colleges and other special purpose funds.

Source: NEDA. 2021b.

The total public investment program for infrastructure actually corresponds to the *Build, Build, Build* Program of the Duterte administration. But what had been more frequently cited in government reporting was the Infrastructure Flagships Projects (IFP) list, a component of the *Build, Build, Build* program that focused on major projects or the banner projects of the previous administration. Naturally, the IFP received more intense scrutiny from stakeholders and the government had often been criticized for the frequent revision of the list.[22] Table 18 below lists the road and rail transport projects in the last update of the IFP in May 2021.

[22] See for example, Rey, A. 2021. Revise, Revise, Revise: Duterte's Build, Build, Build list evolving up to the end, Rappler, July 20. https://www.rappler.com/business/duterte-build-build-build-program-evolving-list-moving-timelines-end-term#.

Table 18. Road and rail transport projects in the Infrastructure Flagship Projects list (May 2021 update)

Project Title	Implementing Agency	Total Project Cost (in PHP million)	Funding Source
Completed			
LRT 2 East Extension	DOTr	9,759.31	ODA (Japan)
Metro Manila Skyway Stage 3	DPWH/TRB	65,390.00	STOA/PPP
Metro Manila Logistics Network: Bonifacio Global City-Ortigas Center Link Road Project	DPWH	5,723.90	GAA
Metro Manila Logistics Network: China Grant Bridges -- a) Binondo-Intramuros Bridge, b) Estrella-Pantaleon Bridge	DPWH	5947.10	ODA (China)
Ongoing projects for completion by 2021			
Surallah-T'Boli-San Jose Road, South Cotabato	DPWH	3,473.00	GAA
Samar Pacific Coastal Road Project	DPWH	1,165.96	ODA (Korea)
Ongoing projects for completion by 2022			
Sindangan-Bayog-Lakewood Road, Zamboanga del Sur and Zamboanga del Norte	DPWH	5,133.01	GAA
Boracay Circumferential Road	DPWH	1,940.00	GAA
NLEX-SLEX Connector Road	DPWH	23,302.00	PPP (Unsolicited)
Cagayan de Oro Coastal Road	DPWH	3,166.53	GAA
C5 Southlink Expressway Project	DPWH/TRB	12,645.00	STOA/PPP
Southeast Metro Manila Expressway Project	DPWH/TRB	45,290.00	STOA/PPP
NLEX Harbor Link Extension to Anda Circle	DPWH/TRB	12,000.00	STOA/PPP
Ongoing projects for completion by 2023 and beyond			
MRT 7	DOTr	75,000.00	PPP (Unsolicited)
MRT 3 Rehabilitation Project	DOTr	21,966.00	ODA (Japan)
North South Commuter Railway (PNR North 1)	DOTr	149,130.00	ODA (Japan)
Manila Metro Line 1 Cavite Extension (Baclaran - Niog, Bacoor) (or the LRT 1 Cavite Extension Project)	DOTr	64,915.00	ODA (Japan)/ PPP
Arterial Road Bypass Project Phase III (Plaridel Bypass)	DPWH	5,260.65	ODA (Japan)

Project Title	Implementing Agency	Total Project Cost (in PHP million)	Funding Source
Davao City Bypass Construction Project	DPWH	46,805.00	ODA (Japan)
Bacolod-Negros Occidental Economic Highway	DPWH	8,095.00	GAA
Camarines Sur High-Speed Highway Project	DPWH	9,235.00	GAA
Pasacao-Balatan Tourism Coastal Highway	DPWH	14,972.29	GAA
Improving Growth Corridors in Mindanao Road Sector Project	DPWH	25,257.00	ODA (ADB)
Davao City Coastal Road Project, including Bucana bridge	DPWH	28,265.00	GAA/ODA (China)
Southern Luzon Expressway Toll Road 4	DPWH/TRB	13,100.00	STOA/PPP
PNR South Long Haul	DOTr	175,318.00	ODA (China)
North South Commuter Railway Extension (PNR North 2, PNR South Commuter)	DOTr	628,420.00	ODA (ADB, Japan)
Mindanao Rail Project Phase 1	DOTr	81,686.00	ODA (China)
LRT 2 West Extension	DOTr	10,120.00	GAA
Metro Manila Subway Project Phase 1	DOTr	356,974.00	ODA (Japan)
MRT 4	DOTr	49,841.00	ODA (ADB)
Panguil Bay Bridge	DPWH	7,375.00	ODA (Korea)
Metro Manila Priority Bridges for Seismic Improvement Project	DPWH	7,933.00	ODA (Japan)
Metro Manila Logistics Network: Pasig River and Manggahan Floodway Bridges Construction Project -- a) North and South Harbor Bridge, b) Palanca-Villegas Bridge, c) East-West Bank Bridge 2	DPWH	15,845.84	ODA (China)
Samal Island-Davao City Connector Bridge	DPWH	23,040.00	ODA (China)
Road Network Development Project in Conflict Affected Areas in Mindanao	DPWH	12,862.75	ODA (Japan)
Metro Manila BRT Line 1 (Quezon Ave)	DOTr	5,463.00	ODA (WB)
Subic Clark Railway	DOTr/BCDA	50,031.00	ODA (China)
Metro Manila Logistics Network: Pasig River and Manggahan Floodway Bridges Construction Project a) J.P. Rizal-Lopez Jaena Bridge (Marikina River) b) J.P. Rizal-St. Mary Bridge (Marikina River) c) Marikina-Vista Real Bridge (Marikina River)	DPWH	9,163.00	ODA (ADB)
Cebu-Mactan Bridge and Coastal Road Construction Project	DPWH	76,413.00	ODA (Japan)
Panay-Guimaras Negros Bridge Phase 1	DPWH	65,701.16	ODA (TBD)

Project Title	Implementing Agency	Total Project Cost (in PHP million)	Funding Source
Bataan-Cavite Interlink Bridge	DPWH	175,656.25	ODA (TBD)
Projects in the Pipeline (still completing government approvals)			
Iconic Bridge Projects for Socio Economic Development	DPWH	5,963.00	ODA (UK)
Panglao-Tagbilaran City Offshore Connector Bridge	DPWH	6,797.96	ODA (China)
Davao City Expressway	DPWH	80,650.52	ODA (China)
Metro Cebu Expressway Project	DPWH	26,625.00	PPP/GAA
Quezon-Bicol Expressway	DPWH	87,296.00	PPP
Cavite-Tagaytay-Batangas Expressway Project	DPWH	29,918.61	PPP (Unsolicited)
TPLEX Extension Project	DPWH	28,925.90	PPP (Unsolicited)
Laguna Lakeshore Road Network Project	DPWH	177,856.10	ODA (ADB)

Notes: ADB - Asian Development Bank
BRT - bus rapid transit
GAA - General Appropriations Act
NLEX - North Luzon Expressway
ODA - official development assistance
PPP - public-private partnership
SLEX - South Luzon Expressway
STOA - Supplemental Toll Operation Agreement
TPLEX - Tarlac-Pampanga-La Union Expressway
TRB - Toll Regulatory Board

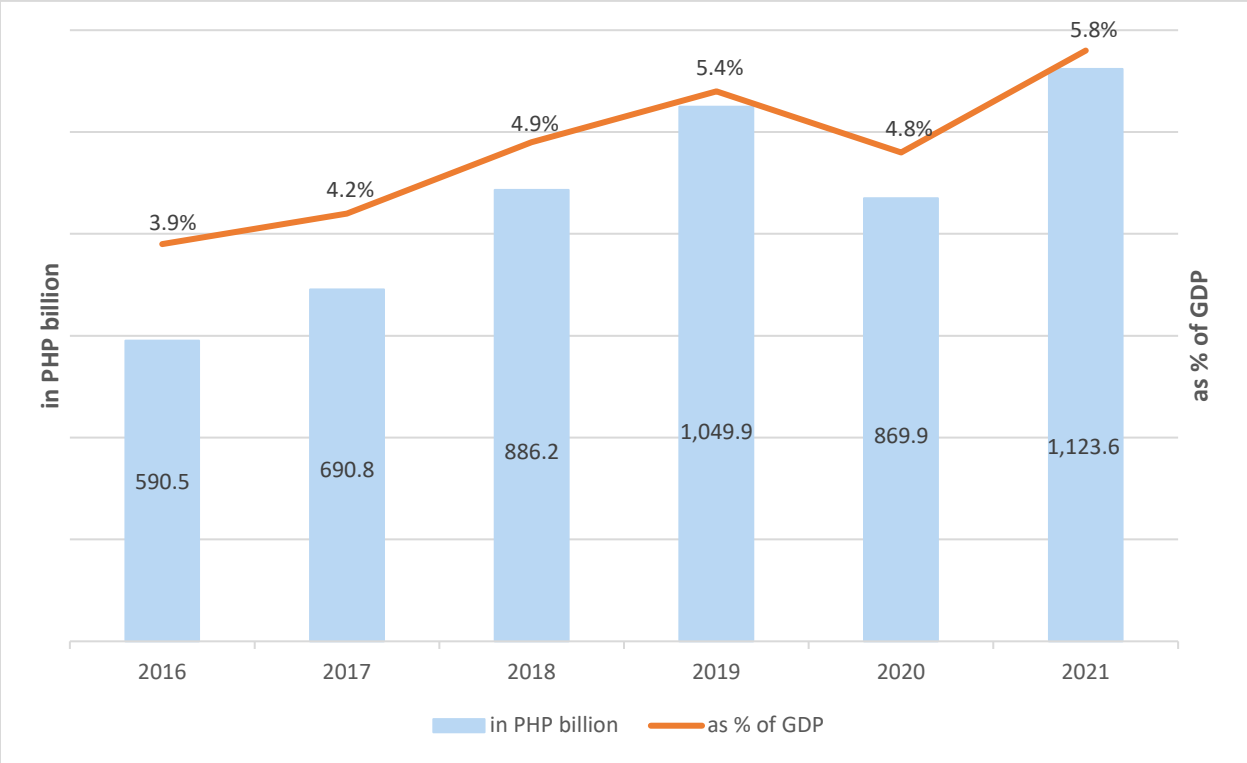
Source: NEDA (2021c).

In Table 18 above, only four projects were completed by the end of the previous administration. The projects under the category "Ongoing projects for completion by 2021" were in fact not completed on time. In the case of the Surallah-T'Boli-San Jose Road, the 2021 Regional Project Monitoring System (RPMES) Report for Region XII shows that it was not completed in 2021 and it was a subject of problem-solving sessions as of 2022. The RPMES-XII recorded slippages of -3.50 percent for package E and -31.20 percent for package A of the project (NEDA Regional Office XII 2022). The Samar Pacific Coastal Road Project was also not completed in 2021. Nevertheless, the DPWH was able to complete major components of the project, namely, the 161-meter Simora Bridge and concreting of 8 kilometers of the road project, and opened these to the public on June 27, 2022 (DPWH 2022b).

Spending targets and accomplishments

Recall that the target public infrastructure spending was 7.4 percent of GDP by 2022. The trajectory of accomplishment, based on actual disbursements, from 2016 to 2021 shows that the 7.4 percent target may not have been achieved by end-2022 (Figure 19).

Figure 19. Infrastructure spending as percentage of GDP (based on actual disbursements)



Source: NEDA (2022) citing DBM/DBCC as source of data.

Unfortunately, there is no readily available data on the aggregate annual spending for the road transport and the rail transport sectors. The sources of public funding for the road transport sector include the budget allocations of the DPWH (the budget of which also include non-road projects like flood control, water resources development, and building construction), the Department of Agriculture (DA) for farm-to-market roads, the DILG for conditional matching grants for road projects, the Department of Tourism for tourism road projects, and the Department of Trade and Industry for some of the industry-tourism convergence road projects. The National Disaster Risk Reduction and Management Fund is also a funding source for the repairs of roads and bridges damaged by calamities. The sources of public funding for rail sector projects include the budget allocations of the DOTr, the PNR, and the LRTA. This study nevertheless focused on the spending performance of the two agencies primarily in charge of these sectors–the DPWH and the DOTr– and the analysis yields interesting results. Table 19 below shows the appropriations, allotment, obligations, and disbursements of the DPWH and the DOTr for fiscal years 2016 to 2021. These are used as basis for measuring the absorptive capacity of these agencies, where absorptive capacity, as it relates to budget performance, is defined as "the ability of an agency to maximize the use of available resources" (Manasan and Mercado 2001, p. 27).

In determining the absorptive capacity of agencies, Manasan and Mercado (2001) recommended an overall absorptive capacity index that is computed as the ratio between the budget programming index (which is allotment divided by appropriation) and the allotment utilization index (which is obligation divided by allotment). Computing absorptive capacity in this way results in high indices for the DPWH and the DOTr, as high as 99.9 percent in 2021 for the DOTr. But this measure of absorptive capacity, which primarily focuses on the ability of an agency to obligate the funds that were programmed, is deficient as it fails to capture the ability of an agency to actually implement the funded projects or activities in a timely manner and thereafter settle the payments for these. An indicator of absorptive capacity that focuses on disbursements is thus more informative.

Assessing absorptive capacity based on the disbursement rate of agencies is desirable since the indicator measures the ability of a government agency to settle or pay its obligations. Timeliness of payments can be influenced by various factors, but it is often influenced by the timeliness itself of the implementation of projects and activities that are authorized to be funded by the appropriations for a certain fiscal year. An agency may achieve a high obligation rate and yet exhibit a very low disbursement rate for a fiscal year. In the context of infrastructure projects, this may mean that an agency has obligated most of the funds by fast-tracking the signing of contracts for projects before the fiscal year ends, but has failed in the timely delivery of actual goods and services during the year or have contracted the activities with a protracted schedule of completion of milestones, that is, with completion schedule beyond the current fiscal year. A low disbursement rate for infrastructure projects is therefore an indicator of the weak ability of an agency to timely deliver the goods and services that are envisioned by the GAA to be delivered within the fiscal year. Put differently, the disbursement rate is a rough indicator of the ability of an agency to ensure that beneficiaries get the project benefits in a timely manner and in line with the developmental objectives of plans and programs.

Table 19. DPWH and DOTr appropriations, allotment, obligations, and disbursements, 2016-2021 (in PHP '000)

	Appropriations		Allotment		Obligations Incurred		Disbursements	
	DPWH	DOTr	DPWH	DOTr	DPWH	DOTr	DPWH	DOTr
2016	570,358,936	92,565,009	549,535,399	92,161,915	425,841,691	61,798,479	311,807,726	48,955,592
2017	688,995,029	83,413,804	674,932,885	82,280,544	621,940,729	69,227,132	225,857,451	27,129,678
2018	759,241,707	83,260,258	752,164,100	83,259,003	696,256,453	74,893,853	298,481,162	30,510,094
2019	563,617,919	113,264,092	547,585,962	107,530,542	480,547,225	91,614,257	271,087,046	38,894,925
2020	507,608,556	121,398,554	503,893,247	120,196,178	466,060,236	116,320,957	145,251,278	42,869,218
2021	749,792,662	112,249,468	710,366,709	105,514,459	662,189,884	99,045,277	403,732,296	46,559,366

Notes: The budget terminologies used here are defined by the DBM as follows (DBM 2012):

Allotment - an authorization issued by the DBM to an implementing agency to incur obligations for specified amounts contained in a legislative appropriation.

Obligations - liabilities legally incurred and committed to be paid for by the government either immediately or in the future.

Disbursements - the actual withdrawal of cash from the Bureau of the Treasury due to the encashment of checks issued by agencies and payment of budgetary obligations.

Source: DBM (2022a).

Table 20. DPWH and DOTr obligation rates and disbursement rates, 2016-2021

Year	Obligation Rate (Obligation / Allotment)		Disbursement Rate 1 (Disbursement / Obligation)		Disbursement Rate 2 (Disbursement / Appropriations)	
	DPWH	DOTr	DPWH	DOTr	DPWH	DOTr
2016	77.5%	67.1%	73.2%	79.2%	54.7%	52.9%
2017	92.1%	84.1%	36.3%	39.2%	32.8%	32.5%
2018	92.6%	90.0%	42.9%	40.7%	39.3%	36.6%
2019	87.8%	85.2%	56.4%	42.5%	48.1%	34.3%
2020	92.5%	96.8%	31.2%	36.9%	28.6%	35.3%
2021	93.2%	93.9%	61.0%	47.0%	53.8%	41.5%

Source: DBM (2022a).

Table 20 above shows the computation of disbursement rates for the DPWH and the DOTr from 2016 to 2021. In the original reports of the DBM for 2016 to 2020, the reported disbursement rates are only as a percentage of obligations. In 2021, the DBM started reporting the disbursement rate as a percentage of appropriations. The disbursement rate as a percentage of appropriations is important as it shows the actual spending performance of the agencies relative to what Congress authorized them to spend. Thus, this study extends the computation and presents also the 2016 to 2020 disbursement rate as a percentage of appropriations (columns 5 and 6 of Table 20). Computing the disbursement rates using the two methods (as a percentage of obligations and as a percentage of appropriations) yields the conclusion that both the DPWH and the DOTr continue to have low absorptive capacity for funds. In fact, their absorptive capacity in terms of ability to actually spend deteriorated from 2016 to 2017, then remained low afterwards. As delays in spending and payments suggest delays in the actual delivery of projects, it is important to examine what implementation challenges may have caused the delays, which is done in the next section.

4. Implementation challenges

As revealed in our focus group discussions, key informant interviews, and desk research, there are numerous problems and challenges during the implementation stage. Some are persistent problems such as right-of-way (ROW) acquisition problems and adverse impacts of weather disturbances, while some are newly introduced challenges such as mobility restrictions due to the pandemic and the additional approval stage in the "for later release" category of the budget.

4.1 Findings from focus group discussions and key informant interviews

Focus group discussions (FGD) with participants from the DPWH-Bureau of Construction, DPWH-Planning Service, and Department of Agriculture-Bureau of Agricultural Engineering were held on August 2, 2021. Key informant interviews with representatives of the DILG-Office of Project Development Services were conducted on August 12, 2021. The following project implementation issues and challenges surfaced from the discussions:

- Pandemic-related restrictions delayed the ROW acquisition. Because of the pandemic, there had been delays in project implementation. These were not delays related to construction but delays due to mobility and other restrictions that made ROW acquisition very challenging. The DPWH nevertheless released policies to respond to the pandemic, namely, electronic submission and receipt of bids for the procurement of civil works contracts, revised construction safety guidelines for the implementation of infrastructure projects during the COVID-19 public health crisis, revised guidelines on approval of work suspension order, work resumption order, and contract time extension for civil works contracts, and revised guidelines on the approval of variation orders and contract documents.

- The delays in the DBM fund release for the items under the "for later release" (FLR) category also delayed the implementation activities. (See Box 2 for the context of "for later release" funds.) For example, in fiscal year 2020, FLR funds started to be released only in August 2020 and some were released as late as December 2020. In some cases, funds released under the FLR mode were also not the full project requirement. In the case of farm-to-market roads in 2020, almost half of the aggregate budget were FLR funds with no RDC endorsements, and thus contributed to the delays.

Box 2. "For Later Release" funds category in the guidelines on the release of funds to government entities

After every enactment of the General Appropriations Act (GAA), the DBM issues the National Budget Circular (NBC) on the guidelines on the release of funds. It prescribes the procedural guidelines on the release, utilization and monitoring of budget items authorized under the GAA. It usually has two attachments — Schedule I prescribing the procedures for "GAA Items for Comprehensive Release through the GAA as Allotment Order", and Schedule II prescribing the procedures for "Expenditure Items for Later Release (Negative List) through Special Allotment Order/General Allotment Order (SARO/GARO)". The "For Comprehensive Release" funds under Schedule I are readily released to the implementing government entities. Under Schedule II on "For Later Release" funds, there are items for which the issuance of a SARO requires the submission to the DBM of "Special Budget Request (supported with Separate/Detailed Financial Plan, Monthly Disbursement Program, physical plan and other required documentary support)".

The so-called "Congressional insertions" are in Schedule II. It is a well-known fact that during budget deliberations, legislators in their exercise of "the power of the purse" insert new budget items or expand certain proposed budget items (i.e., the Congressional insertions), which they often do by reducing certain proposed budget items or entirely removing them (as they cannot increase the total size of the budget proposed by the President). Starting in fiscal year (FY) 2020, the GAA item category for Congressional insertions that usually appear in Schedule II had an additional requirement before the release of funds—the President's approval. In previous years, it was not a requirement and it had been enough that the President exercised his or her veto power to disapprove certain Congressional insertions before signing the GAA.

In FY 2020, this is how the entries in NBC 578 - Guidelines on the Release of Funds for FY 2020 appeared:

"Schedule II - Expenditure Items for Later Release (Negative List) through SARO/GARO
xxx
Section 2.0
2.1 GAA items
xxx
2.1.4 Congress-introduced increases in appropriations and new budgetary items shall be subject to submission of the following additional documentary requirements:
2.1.4.1 Details covering the project or program
xxx

2.1.4.7 **President's approval/directive** on the basis of initial DBM recommendation [emphasis ours]."

In FY 2021, this is how the entries in NBC 583 - Guidelines on the Release of Funds for FY 2021 appeared:

"Schedule II - Expenditure Items for Later Release (Negative List) through SARO/GARO
xxx
Section 2.0
2.1 GAA items
xxx
2.1.4 Congress-introduced new budgetary items **subject to the approval of the President**. [emphasis ours]."

In FY 2022, this is how the entries appeared in NBC 587 - Guidelines on the Release of Funds for FY 2022 appeared:

"Schedule II - Expenditure Items for Later Release (Negative List) through SARO/GARO
xxx
Section 2.0
2.1 GAA items
xxx
2.1.7 Completely new items of appropriations which the agency cannot certify as ongoing, **subject to the approval by the Office of the President** [emphasis ours]."

Source: DBM (2020; 2021; 2022b).

- There were delays in improving the quality such as the paving rate for roads because there were some contractors who still failed to comply with the DPWH quality control program. The DPWH issues warnings to these contractors. They are able to catch these instances because a quality control process is in place at the DPWH. Before they issue a certificate of completion to a project, the Quality Assurance Unit will inspect that project first. After the certificate of completion has been issued, there is a one-year Defects Liability Period within which the DPWH monitors the project and if any defects appear within this period, the contractor will have to fix the defects satisfactorily before the DPWH issues a certificate of final acceptance. For DPWH national road projects, absorptive capacity (in terms of ability to enter into contracts) in the industry of contractors is nevertheless not a problem because there are many triple A rated contractors and some of them even enter into joint ventures.

- Many of the farm-to-market roads (FMR) are still not paved with concrete and are disconnected due to erroneous past practices. Before 2012, the construction of gravel and tire track FMRs and having project length as short as 100 meters were still allowed. To cover more geographic areas or to be able to distribute funds to more LGUs, FMR projects

were then being split into short segments. Differences in quality and the shortness of improved road segments made upgrading the connecting roads difficult. In 2012, design standards for FMRs were issued and the new standards required, among others, that these roads be paved with concrete and that a project should be a continuous segment measuring at least 1 km. Major improvements in FMRs started to happen in 2014 onwards and the locations of the disconnected FMRs are now being mapped by DA through a Farm-to-Market Road Network Plan. This plan is supposed to rationalize the identification, prioritization, and allocation of resources for FMRs using a logical, science- and evidence-based approach. The DA also has a web-based platform for FMR inventory—geoagri.da.gov.ph. However, the platform's coverage the time of writing is the Mindanao region only.

- The standard costing of FMR (at PHP 12 million per km. at the time of the key informant interview) is not realistic as it is applicable only for straight roads. In some FMRs, additional civil works are needed because of the variations in terrain. The construction of riprap and culverts is usually required when there are terrain variations. Inflation has also contributed to the increase in the cost. The DA and the DPWH nevertheless have started discussing the issues surrounding the standard cost.

- Political intervention in the finalization of the list of projects in the GAA is a huge problem. There are projects in the national expenditure program that are being replaced by other projects during the GAA deliberation and finalization process. These Congressional insertions do not undergo the usual due diligence process that is supposed to ensure that the project is feasible or that the site is ready for implementation. These political interventions happen yearly. These are the reasons behind the "for later release" funds categorization. Because there are missing requirements, the DBM could not release the funds immediately. When a project that is inserted in the GAA is not feasible, it becomes a bottleneck in the whole implementation process because the project usually still needs to be modified or undergo a painstaking project development process to make it feasible. There is a project development process in place—the DPWH has institutionalized the conduct of feasibility study in projects costing more than PHP300 million. But because of political interventions, there were instances when project details were not prepared in advance. When implementation comes and ROW acquisition becomes a big issue, it becomes the implementing office's prerogative to proceed with the project or return the budget allocation to the treasury.

- Monitoring and evaluation (M&E) is still not institutionalized. As of now, the DPWH monitoring is focused on performance governance scorecard only and it is still strengthening its M&E setup. Currently, no specific office in the DPWH is dedicated to conduct M&E. However, the Bureau of Construction is the administrator of the Project and Contract Management Application (PCMA) that is being used to monitor the physical

accomplishment in DPWH infrastructure projects. The PCMA is a tool used for updating every progress or activity undertaken in a project. It is used to monitor if project implementation is on time or behind schedule. It provides the concerned officials a "red flag" notice if a project is behind schedule so that they can initiate appropriate actions. The DPWH is still building the capacity of its regional and district offices on the importance of ex-post evaluation. Foreign-assisted projects are nevertheless being subjected to M&E as it is starting to be required by ODA partners. The DA also has some form of "rapid" M&E. Through the Rapid Appraisal of Emerging Benefits from FMRs, the DA conducts a rapid assessment of the benefits to the farmers a year after the FMR was constructed.

- The Supreme Court ruling on the Mandanas-Garcia case will affect the timely completion and quality of infrastructure projects because of the lack of technical capability in some LGUs. There are provinces and municipalities which are still weak in procurement and even in construction supervision. There are also problems in the absorptive capacity of local road contractors who deal with LGUs. There were cases where LGUs allowed contractors to bid without license or accreditation. Nevertheless, the Kalsada-Conditional Matching Grant to Provinces (CMGP) of the DILG had provided interventions to address problems in local road projects. This program recognizes that the issue in local roads is not merely inadequacy of physical infrastructure but also weak governance. Thus, there are seven key reform areas in Kalsada-CMGP: (1) information management system, (2) road network development planning and detailed engineering design, (3) construction and maintenance, (4) asset management, (5) internal audit, (6) procurement, and (7) planning, budgeting, and revenue generation. At least in the provincial level, there have been realizations that local road management does not just involve the engineering office but requires a multidisciplinary approach that also involves planners, accountants, treasurers, and budget officers. These personnel, together with the engineering staff, form the Local Road Management Teams. They oversee the implementation of the seven key governance reform areas. In 2020, the DILG cascaded to the municipalities the capacity building efforts tested in the Kalsada-CMGP through the Assistance to Municipalities program. Unfortunately, the Assistance to Municipalities had been discontinued starting in 2021.

- There is still a large gap in upgrading the quality of local roads because of numerous issues. There are more "poor" to "bad" rated roads than "good" to "fair" rated roads at present. One reason for this is limited funding. When Kalsada-CMGP started, it was supposed to target a minimum of PHP 20 billion annual funding for the conditional grants but this did not happen because of inadequacy of national government resources. Completing projects on time is also a challenge for LGUs, and this is why the DILG is specifically building the LGUs' capacity in planning and construction supervision. The lack of manpower in LGUs is also a major reason for delays in project completion, especially in municipalities and low-income LGUs. These LGUs are often understaffed. There are some municipal engineering offices with only one or two technical staff. Because of lack of monitoring in

some municipal roads, subpar quality or poor workmanship (e.g., use of large rocks on pavements and poor base construction, in turn resulting in cracks on the surface) sometimes becomes an issue. Some conditional matching grant projects for municipalities also encountered ROW problems that were discovered only during actual project implementation, that is, when the national government funds had already been released. This happened because in the setup, the mayor just signed a notarized certification or omnibus sworn statement saying that there is no ROW problem and then it was discovered later that what the mayor signed is not true. In some cases, the reason for implementation problems is on the side of the contractor, such as not following the required number of workers, delay in the delivery of materials, or poor workmanship even for replacement work. In other cases, the reason is geographic location-specific such as the LGU being in a conflict-affected area (and thus encountering peace and security challenges), weather disturbances in the LGU, and difficulties in access to materials due to the mountainous terrain or because the LGU is an island municipality. In mountainous areas, delivery of materials is difficult and double handling in delivery often happens, resulting in increased cost of materials. In hard-to-reach island municipalities, there are quality problems in available materials. There were even cases when the sand that was used came from the sea, which is not acceptable for concrete structures because introducing salty materials in the mix results in rusting of the reinforcement steel bars. Another persistent issue in LGU road projects is weak maintenance; some of the LGUs just build roads but do not fund the required periodic maintenance.

4.2 Findings from regional project monitoring reports

Below is a summary of implementation problems on the ground as revealed in regional project monitoring documents in 2021. The set of 2021 project monitoring reports is selected to check the most recently available information on persistent implementation problems and to economize on the research and assessment effort. The sources of information are the Regional Project Monitoring and Evaluation System (RPMES) reports of the inter-agency Regional Project Monitoring Committees (RPMCs) as of end-December 2021. The RPMCs are chaired by the NEDA Regional Offices (NROs). The types of information made available by the NROs through the RPMES reports vary: some NROs provided reports narrating or summarizing the findings from RPMES forms while some NROs provided the numerous RPMES forms or project matrices. In some reports, the narration of implementation problems is for the infrastructure sector as a whole and thus it had not been possible for the PIDS study team to distinguish which of the problems apply to the road and rail transport sectors alone. Whereas in some reports, the problems specific to the road or rail projects are mentioned. The summary below distinguishes whether the implementation problems pertain to the whole infrastructure sector or to road/rail projects specifically. Note that only one region, Region IV-A, reported an implementation problem in the rail sector. (It is important to note also that once the projects start the construction stage, they become covered by the RPMES. Thus, although the Mindanao Railway project is already encountering delays in pre-construction activities, it is not yet covered by the RPMES since it has

not yet entered the construction stage. It was supposed to be monitored nevertheless by the implementing agency, the DOTr.)

Summary of implementation problems in RPMC-monitored projects in fiscal year 2021

Cordillera Administrative Region

The main reasons for the delay in road projects were: adverse/inclement weather conditions (especially because of Typhoon Maring in October and Typhoon Odette in December); poor performance of contractor, mostly due to lack of skilled manpower and equipment (which in turn were not accepted by the DPWH as basis for contract extension and warranted the application of liquidated damages); road right of way (ROW) acquisition issues; and delays related to cross-border mobility restrictions due to the COVID-19 pandemic. Other challenges encountered were: accessibility of worksite or materials; funding and institutional approvals/requirements; and boundary conflict issues arising from ancestral land claims.

Region I (Ilocos Region)

Implementation problems in the infrastructure projects included: delayed procurement and deliveries of materials; weather disturbances; and delayed activities brought about by the mobility restrictions in adherence to the standing health protocols.

Region II (Cagayan Valley)

The main problems in road projects were the occurrence of inclement weather which resulted in the ground becoming unworkable, road right of way issues, and variation orders. In one bridge project, the revision of construction plan and design delayed the project implementation. In the conditional matching grants for provinces, inclement weather and unworkable site delayed project implementation. In the Batanes islands, the effect of Typhoon Kiko and the continued restriction in movement due to the pandemic resulted in scarcity of labor and difficulty in transporting construction materials from mainland Luzon to the province.

Region III (Central Luzon)

Project-specific issues in road projects included the delays due to COVID-19 infection of the contractors' employees, obstructions due to ongoing road works in the only access road going to the project site, obstructions due to delayed removal of electric posts, ROW acquisition issues such as non-submission of land title and pertinent documents and delayed payment, change in the design of bridge component due to the need for farm passages and drainage (as requested by farmers). In certain recently completed bypass road projects, the regional monitors also called the attention of the DPWH and the DILG regarding the encroachment on the road space of makeshift establishments (e.g., food stalls, vulcanizing shop, and auto repair shop), the intrusion of motor vehicles on the bike lanes due to the absence of barriers and bollards, the illegal parking of trucks along bike lanes, and the lack of a weight limit system (thereby allowing overweight vehicles to pass through).

Region IV-A (CALABARZON)

The project-specific implementation problems in road projects were all related to ROW acquisition: delayed payments to landowners, delays in ROW-related activities due to the Taal Volcano eruption and environmental concerns, ROW issues related to electric posts, insufficiency of budget for ROW acquisition, and delays in negotiations with landowners. In one rail project, implementation problems included land valuation issues, delay in ROW acquisition, and conflict of the ROW alignment with another transport project.

Region IV-B (MIMAROPA)

The reported problems in infrastructure project implementation were: travel restrictions due to the COVID-19 pandemic, ROW acquisition issues, delayed delivery of construction materials, and unworkable site due to inclement weather condition.

Region V (Bicol)

The major problems cited in road projects were: non-issuance of permit to cut trees, obstruction caused by existing facilities, ROW acquisition problem, and inaccessibility of the project site due to inclement weather. There were also cases where the project implementation was suspended because the access road going to the sites were road projects themselves that were not yet completed.

Region VI (Western Visayas)

The project-specific issues in implementing road projects included the following: ROW problem (including expropriation proceedings and refusal of lot-owners to sign documents); presence of obstructing Japanese pillbox (a type of concrete dug-in guardpost equipped with loopholes through which weapons can be fired) from the World War II period, presence of illegal structures or informal settlers, presence of agricultural crops as project site obstruction, and non-issuance of tree cutting permit by the City Environment and Natural Resources Office.

Region VII (Central Visayas)

The project-specific implementation issues in road projects included the following: ROW acquisition problem (leading to project termination in a few cases given the very high negative slippage), temporary project suspension due to ongoing ROW expropriation proceedings, presence of obstructions due to informal settlers' structures, unavailability of service facilities and manpower due to Typhoon Odette, and misrepresentation of the contractor.

Region VIII (Eastern Visayas)

Among the implementation problems encountered in road projects were: unworkable ground due to unfavorable weather condition, onslaught of Typhoon Odette, COVID-19-related travel restrictions hampering the delivery of materials such as aggregates, ROW acquisition issues,

insurgency or peace and order problem, procurement problems, and lack of manpower and needed materials in the project site. There were also projects which incurred negative slippages because of the slow performance of the contractor.

Region IX (Zamboanga Peninsula)

The road project-specific problems included the following: inadequacy of Portland cement in the Ilijan plant, intrusion of the road alignment on existing public facilities (specifically, a public cemetery and an irrigation canal), damage to a newly constructed segment because it was used as access road for hauling heavy aggregates to an adjacent project, presence of agricultural crops as obstruction, frequent and heavy rain making the project access road unpassable, and delays in the delivery of materials due to strict COVID-19 protocols.

Region X (Northern Mindanao)

Implementation problems in the infrastructure sector that contributed to project delays were: adverse impacts of Typhoon Odette, continuing restrictions due to COVID-19, ROW acquisition issues, and unavailability of materials in the market.

Region XI (Davao)

Implementation issues in road projects included the following: ROW issues such as resistance of landowners and unresolved land disputes, obstruction of public utilities, poor performance of contractors (due to lack of manpower and insufficient equipment and materials), revision of plans, and heavy rainfall affecting the condition of project sites.

Region XII (SOCCKSARGEN)

Project-specific issues in road projects included: variation orders, ROW acquisition problem, obstruction from electrical/telecommunication posts and cables, unworkable condition at the project site due to frequent heavy rain, unresolved ROW issue and refusal of the landowner to issue a permit to enter the site.

Region XIII (Caraga)

No implementation problems were observed in the monitored road projects for the year. (Most of the problems listed by the monitors were in irrigation projects.) However, the monitors reported important observations in a completed road project, as follows: During heavy rains, some portions of the road are flooded due to lack of drainage facilities. Since drainage facilities were not included in the plan, the RPMC advised the DPWH to study which areas along the project alignment would need drainage structures and propose a budget for such in the next budget cycle.

4.3 Findings from the desk research related to rail sector projects

As seen in Section 3.2, the lone completed rail sector project in the Infrastructure Flagship Projects list is the LRT-2 East Extension. It extended the LRT-2 line from Santolan station by 3.8 kilometers by adding two new stations—Marikina and Antipolo. It is expected to reduce travel time between Manila and Antipolo from two to three hours to just 40 minutes. It can accommodate an additional 80,000 passengers daily, boosting the LRT-2's pre-project completion daily ridership of 240,000 passengers. It was inaugurated by former President Duterte and was opened to the public on July 1, 2021 (LRTA 2021). The other rail projects have been encountering delays due to various reasons. Among the problems are ROW issues, lack of consistency in decision-making and attendant legal disputes, and delays in financing. The following discussions explore these problems by citing the rail projects that are experiencing them.

Right-of-way issues

ROW issues can stall the completion of a project no matter how early or efficient the other stages in project implementation are. The case of the MRT-7 best illustrates this difficulty. The MRT-7 project, the contract for which was signed in 2008 but got implemented only starting in 2016, is a 22-km. rail transit system that will connect Quezon City to Bulacan province. It is a PPP project, with a 25-year cooperation period under a Build-Gradual Transfer-Operate and Maintain (BGTOM) scheme. San Miguel Corp. (SMC), which bought the original signatory to the project (Universal LRT Corp.), is the government's private sector partner. The SMC created the SMC Mass Rail Transit 7, Inc. (SMRT7) to be the project concessionaire and contracted the Hyundai Rotem-EEEI consortium as engineering, procurement, and construction contractor.

Problems in ROW acquisition emerged in 2018. The acquisition of a 33-hectare lot in Bulacan for the MRT-7 train depot reached the point when the DOTr filed expropriation proceedings. But the property owner questioned the expropriation in Malolos regional trial court and the court ordered the DOTr to pay the property owner PHP1,800 per square meter. This figure is the new zonal valuation by the BIR district office but was still not yet enforced at the time. It was much higher than what was budgeted based on the BIR valuation prevailing during budget estimation. The proposed zonal valuation is nearly 900 percent higher than the actual valuation at the time (Subingsubing 2018).

The proposed ROW site was moved to Quezon City and on November 27, 2019, the DOTr announced that the ROW problem had been solved as two Quezon City regional trial courts granted writs of possession of a 20-hectare lot in favor of the DOTr and its concessionaire, SMRT7 (Galvez 2019). However, the real estate company which owns the lot challenged the expropriation as the amount offered was "way below what was required by law" (Austria 2019). Finally, on May 31, 2022, the SMC announced that a 20-hectare property in San Jose del Monte, Bulacan had been secured and that it had started construction on the MRT-7 depot (Barroga 2022). The PPP Center reported that the total accomplishment rate for construction work was 64.68% as of September 30, 2022 (PPP Center 2022).

Lack of consistency in decision-making and attendant legal disputes

Changes in leadership sometimes result in lack of continuity or follow through in earlier decisions. This is particularly true when politicians treat infrastructure projects as their political legacy. Although this problem is more frequent in LGU-level projects because of the shorter term for local chief executives (i.e., three years for one term), examples at the national level are also present especially in the case of big-ticket infrastructure projects. Further, this problem is often exacerbated by legal disputes that are corollary to not honoring original agreements. These issues are the major causes of delay in the construction of the Unified Grand Central Station or the Common Station. The Common Station, which broke ground in September 2017 after being stalled for years, is a 13,700-square meter concourse area in North EDSA, Quezon City meant to interconnect the existing LRT-1 and MRT-3 and the future MRT-7 and Metro Manila Subway. It is designed to benefit at least 500,000 commuters daily (DOTr 2021).

The project originally secured the NEDA Board's approval in July 2009 and then the Board's reapproval in November 2013. The decision-making consistency issue is rooted in deciding whether the Common Station should be built near the SM City-North Edsa or the Ayala Trinoma Mall, two adjoining shopping malls in the North Avenue area. In 2009, under the leadership of former Department of Transportation and Communication Secretary Mendoza, the original plan was to place the Common Station beside SM City-North EDSA and with the naming rights given to SM. However, when former DOTr Secretary Abaya took over, the decision was changed. According to former Secretary Abaya, the original design near the SM City North EDSA was "ineffective and costly," hence the need for a study that will determine the most effective and cost-efficient location of the station (Amojelar 2013). In 2013, the NEDA Board reapproved the construction of the Common Station but with changes in the original location, this time near the Ayala Trinoma Mall. SM Prime then sued the government and was eventually able to secure in 2014 a temporary restraining order from the Supreme Court, stopping the relocation. Finally in 2017, the new leadership at the DOTr, Secretary Tugade, broke the deadlock and signed with the owners of the two malls a memorandum of agreement (MOA) for a plan to build the station between SM City North Edsa and Trinoma Mall. Both malls will now have naming rights to the station (Desiderio 2017).

Delays in financing

Financing railway projects is difficult because these projects usually have high upfront capital requirements while the government has limited fiscal space. This is the rationale for the DOTr's financing strategy of using ODA as major funding source for greenfield rail projects and for rail extension projects outside Metro Manila. Currently, the Philippines' major ODA partners for rail projects are JICA, China, and ADB.

The Mindanao Railway Project, which was proposed for China financing, has been suffering delays. The Mindanao Railway is envisioned to be the first train system outside Luzon. The DOTr is attempting to implement the project on a phased basis, starting with the 102-km. Tagum-Davao-Digos segment, the first of the envisioned three segments of the railway. Approved by the NEDA Board in 2017, the Mindanao Railway Tagum-Davao-Digos (MR-TDD) segment will connect

Tagum City in Davao del Norte, Davao City, and Digos City in Davao del Sur. Eight stations are proposed along its alignment. It is expected to reduce travel time between Tagum and Digos from 3.5 hours to 1.3 hours (DOTr 2021).

The financing mode with China, however, is different from other ODA sources—the condition is that the procurement of project management consultancy and of the builders for the design-and-build package must proceed first before the final loan signing. In addition to the MR-TDD project, the Subic-Clark Railway Project and the PNR Bicol Package 1 were also proposed to be financed by China loans. In the case of the MR-TDD, the DOTr already awarded to the consortium of China Railway Design Corporation and Guangzhou Wanan Construction Supervision the project management consultancy contract on October 21, 2021 (DOTr 2021). But before the Duterte administration stepped down, the former finance secretary withdrew the government's application for Chinese loans, citing the slowness of Beijing to act on the Philippines' funding requests and the high interest rate of the loan relative to other sources (three percent interest rate for China railway loans versus 0.1 percent for Japan railway loans). Nevertheless, given the initial engagements made, the Marcos administration gave instructions to the Philippine economic team to return to the negotiating table with China (Rosales 2022). As of this writing, there are no updates on how the negotiations are going.

5. Conclusions and Policy Insights

Our analysis of quantity and quality indicators in the road and rail transport sector shows that the Philippines continues to suffer from inadequate and poor quality road and rail transport infrastructure. The illustrations of this in the previous sections of this study are numerous. For instance, although there have been increases in road lengths, road densities in the regions remain low and this is indicative of weak connectivity. The quality of national roads continues to improve but there are still 1.25 percent of national roads that are gravel roads and 0.09 percent that are earth roads; this means that crucial quality improvements in national roads still have to be made. The local roads situation is worse. Despite limited availability of data, there is sufficient evidence to conclude that many local roads are of poor quality and that there is a huge gap in improving connectivity. Based on data from selected LGUs that responded to a 2017 survey, about 47 percent of municipal roads of those LGUs were unpaved. The key informant interviews conducted for this study revealed that there are more local roads which are rated as “poor” to “bad" than those which are rated as “good” to “fair”. Moreover, previous erroneous practices in farm-to-market roads implementation continue to weaken connectivity. The national average for road roughness index also deteriorated, as revealed in the monitoring of PDP targets. In the regions, there are also many bridges which are still considered temporary and must be made permanent through materials replacement (e.g., from timber and bailey to concrete or steel). The rail transport sector had also suffered years of neglect and despite the recent attempts to catch up in the expansion and improvements, the task is simply gargantuan that the recent progress cannot be considered significant. In most metrics of comparison with ASEAN neighbors, the Philippines is also behind in improving the quantity and quality of its road and rail transport infrastructure.

The assessment of targets and achievements in the Philippine Development Plan, the Public Investment Program, and the expenditure program reveals that many of the targets were not met. The low absorptive capacity, as indicated in unmet expenditure targets, of the major agencies in charge of the road and rail transport sector suggests problems in implementation.

Digging deeper into the implementation challenges, this study finds that the persistent problems are right-of-way acquisition, financing, political intervention, weak capacity at the local government level, natural calamities, and project management issues (such as delayed permits and delayed removal of obstructions in project sites or incomplete removal of obstructions even after the projects had been completed). But there were also newly introduced problems, such as the adverse effects of the pandemic on the materials and manpower supply chain and the difficulty of handling the delays in projects funded by "for later release" funds. The release of funds for budget items considered as Congressional insertions, many of which are in the road transport sector, are now required to have the President's approval.

Planning for the long term can help address the persistent problems. A long-term national transport infrastructure plan that is legislated can improve the anticipation by stakeholders of future implementation activities and help in the orderly preparation for land use requirements, right-of-way procedures, financing options exploration and structuring, management of political interests, and capacity building of implementors. Although natural disasters are something that the Philippines has to live with given its geographic location, the adverse impacts of these disasters can be mitigated with proper land use planning and zoning anchored on long-term infrastructure plans. The long-term and sustainable adoption of technological solutions to adapt to climate change and to mitigate the impacts of natural disasters can also be incorporated in long-term plans. Technology choices for long-haul rail transport projects can also be better analyzed with long-term planning.

It would be ideal for Congress to enact a long-term transport plan. In the meantime, the prescribed principles in the existing NEDA Board issuance of the National Transport Policy (NTP) can already be adopted, albeit with a weaker enforcement power relative to a legislation, by implementing agencies. Transparency in reporting to and discussions at inter-agency committees, such as the NEDA Board-Infrastructure Committee (INFRACOM) and the INFRACOM-Inter-agency Technical Committee on Transport Planning (IATCTP), on non-compliance with the prescribed principles in the NTP may help enforcement. Moreover, the current NTP articulated an important mandate that can already be pursued without legislation—the preparation of the Philippine Transport Master Plan. Unfortunately, neither the NEDA Board Resolution nor the IRR for the NTP did not indicate how it will be prepared and who will prepare it. But it is a mandate that the executive branch set for itself and the next steps should be arranging the financing for such master plan and tasking the team and the lead agency for conducting it.

Given the Supreme Court ruling on the Mandanas-Garcia case and the devolution of projects, the national government must continue its capacity building programs for LGUs. The LGUs now have a bigger mandate and there are still many weaknesses in capacities, as revealed in the focus group discussions and key informant interviews undertaken for this study. At the same time, the completion and integration of local roads databases must be fast-tracked as accurate information will be important in scheduling national government support and prioritizing areas that will need that support.

The failures in Metro Manila urban rail transport systems are sources of lessons for cities outside Metro Manila. Performance audits of these systems and benchmarking with cities in other countries could reinforce the lessons. For example, the frequency of delays in PNR commuter trains and LRT and MRT systems in Metro Manila could be tracked in order to set the baseline, the target could be set to gradual improvements to ultimately zero delays, the monthly and annual improvements could be tracked, and accountability systems for those in command could be established. Aside from learning lessons from Metro Manila urban rail systems, local planners and local chief executives in cities outside Metro Manila should start planning for transit-oriented development. Having a long-term vision and articulating that in a planning document would help.

The pandemic-related problems seem to be almost over and systems for addressing them are in place. But the implementing agencies have to continue improving the implementation of revised procedures in response to the pandemic. With respect to the "for later release" funds problem, the issue is complex and it has deep political economy ramifications. It seems to be a battle of wills between two major political influences on project implementation. On one end are legislators who always find ways to insert new or expanded items in the budget, and on the other end is the sitting President who could impose its will on legislators by having post-GAA procedures that could selectively decide on the release of funds for Congressional insertions on a case by case basis. The Filipino public waiting for benefits from projects is caught in between the two. At the national level, seeking reform champions for minimizing Congressional insertions and for fast-tracking executive approvals is necessary. At the regional level, one solution that could be attempted is for government officials to strengthen the practice of project identification and prioritization at the Regional Development Council (RDC) level. The tracking of how many and what percentage of RDC-endorsed projects make it to the GAA can be institutionalized. Having greater transparency in the accounting for and reporting of the RDC priorities as well as readiness of the projects in the RDC list can also help.

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