Transport Starter Data Kit: Historical socio-transport data for Myanmar

Authors

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Abstract

Data on transport activity is an important element for the development of national transport decarbonisation strategies. By having freight and passenger transport information, the impacts on vehicle and fuel consumption changes from replacing internal combustion engine vehicles with electric vehicles can be calculated. The development of a national decarbonisation strategy requires significant efforts. However, access to data is often a barrier to starting transport system modelling in developing countries, thereby causing delays. This article provides data that can be used to support a model for Myanmar, which may act as a starting point for further model development and scenario analysis. The data are collected entirely from publicly available and accessible sources, focusing on national reports, statistical yearbooks, and academia.

Keywords

U4RIA

Transport data

Transport modelling

MAED

Myanmar

Specifications Table

Subject	Transport
Specific subject area	Transport Data
Type of data	Tables Graphs
How data were acquired	Literature survey (databases and reports from international organisations; journal articles)
Data format	Raw and analysed
Parameters for data collection	Data collected based on inputs required to create an energy system model for Myanmar
Description of data collection	Data were collected from the websites, annual reports and databases of international organisations, as well as from academic articles and existing modelling databases.
Data source location	Not applicable
Data accessibility	With the article and in a repository. Repository name: Zenodo. Direct URL to data: https://doi.org/10.5281/zenodo.6539968

Value of the Data

- The data can be used to develop national transport demand models to inform national investment outlooks and decarbonisation strategies.
- The data are useful for country analysts, policy makers, and the broader scientific community, as a zero-order starting point for model development.
- This data could be used to examine a range of possible transport pathways, in addition to the examples given in this study, to provide further insights into the evolution of Myanmar's transport system.
- The data can be used both for conducting an analysis of transport activity and emissions, but also for capacity building activities.
- The data can be used as a call to action in addressing transport data gaps and establishing parameters for data collection to improve the consistency of transport-climate research in these countries.

1. Data Description

The data provided in this paper can be used to support the development of a transport model for Myanmar. The data provided were collected from publicly available sources, including statistical yearbooks, transport ministry reports, statistics from national authorities and affiliated research institutions, academia, and journal articles. Global datasets (primarily from the World Bank) were only consulted if severe data gaps existed. The dataset includes parameters on passenger and freight transport activity, disaggregated by transport mode (road, rail, aviation, etc.) and geographic scale (inter-city or inner-city), if available. The dataset also covers the size of the vehicle fleet, disaggregated by vehicle types. The data coverage and subtypes vary among the parameters. The overall ambition is to include the most recent available year(s).

Item	Description of Content
Figure 1	A graph showing total population (million people), as well as the share of urban and rural population in Myanmar.
Figure 2	A graph showing total GDP (million USD in 2015), as well as the share of the different sectors contributing to GDP in Myanmar: agriculture, construction, mining, manufacturing, service, and energy.
Table 1	A table showing passenger transport activity in Myanmar for the most recent year data was available. The data are curated from national statistics agencies or other government-affiliated agencies.
Table 2	An additional table showing passenger transport activity in Myanmar based on UN DESA Statistics Division data (see explanation below). The data feature information for 2018.
Table 3	A table showing freight transport activity in Myanmar for the most recent year data was available.
Table 4	An additional table showing freight transport activity in Myanmar based on UN DESA Statistics Division data (see explanation below). The data feature information for 2018.
Table 5	Tables showing vehicle fleet data in Myanmar for the most recent year data were available.

For the parameters on passenger and freight transport activity, an additional dataset was included in Table 2 and Table 4. The UN DESA Statistics Division modelled passenger activity and freight activity for every country in support of the SDG Indicator 9.1.2[1]. The passenger activity provides information for road, rail, and air transport. Freight data covers the road, rail and inland water, and aviation. The passenger-km and tonnes-km data originate from the Open SDG Data Hub. In this dataset, only the data for International Transport Forum (ITF) (representing mostly OECD countries) and UNECE countries (mostly European countries) are based on national reporting. For non-ITF/UNECE countries, the data is estimated using the ITF model, which uses several covariates such as GDP, population, and transport network coverage. A description of the model can be found in the ITF Transport Outlook 2017.

1.1   Population

Population data including total population, population growth, and split by rural or urban was gathered from The World Bank Open Data platform[2]. Figure 1 displays the total population disaggregated by urban and rural in Myanmar.

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[1] Freight: https://www.sdg.org/datasets/undesa::indicator-9-1-2-freight-volume-by-mode-of-transport-tonne-kilometres/about ;
Passenger: https://www.sdg.org/datasets/undesa::indicator-9-1-2-passenger-volume-passenger-kilometres-by-mode-of-transport/about
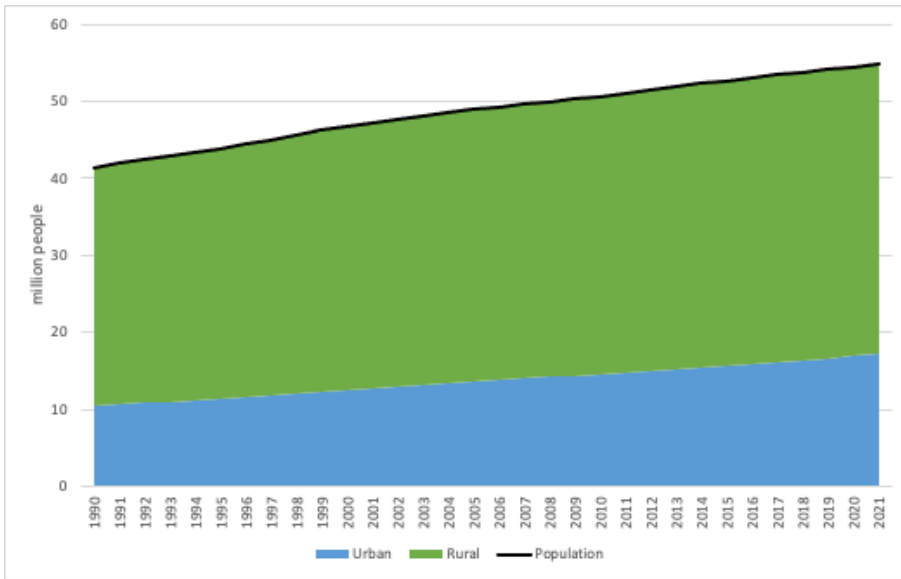[2] https://data.worldbank.org/

Figure 1: Total population (million people) disaggregated by urban and rural in Myanmar

1.2 Gross domestic product (GDP)

GDP data including total GDP, GDP growth, and GDP share by sector (agriculture, manufacturing, service) was collected from The World Bank Open Data platform[2]. Where data was not available, data processing was done. Figure 2 shows the total GDP, as well as the share by sector, in Myanmar.
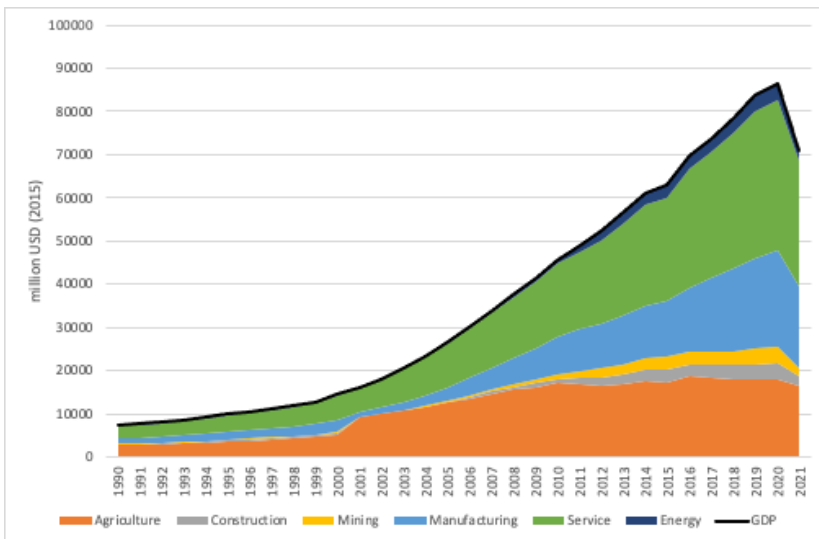

Figure 2: Total GDP (million USD in 2015) disaggregated by share in Myanmar

1.3 Passenger transport activity

Information on passenger transport activity in Myanmar is captured through roads, buses, rail, and waterways. Land transport recorded 30026 million passenger-km in 2019. Every transport mode has

recorded a strong decrease since 2014. The data was provided by the Asian Development Bank's Asian Transport Outlook Database.

Table 1: Recorded passenger transport activity (million passenger-km) in Myanmar

Mode	2014	2015	2016	2017	2018	2019
Rail	3583.7	3416.22	3133.35	3163.8	3214.91	1444.23
Waterways	155.5	87.77	72.2	66.13	29.93	-
Buses	1732.78	777.282	726.625	709.112	702.054	292.02
Road	41170	40840	111288	25837	51747	28582
Total land transport	44753	44256	114421	29000	54962	30026

Source: ADB, 2021, Asian Transport Outlook Database, https://data.adb.org/dataset/asian-transport-outlook-database

Regular data coverage has existed since 2004. There is sporadic data for some years (e.g., 1990, 1991, 1995). Road passenger activity has been recorded since 2014.

According to the UN DESA modelled data, it is estimated that the passenger activity in Myanmar is 78899 million passenger-km in 2018. The large majority of passenger activity is conducted through road transport, but a significant amount is also via rail.

Table 2: Modelled passenger transport activity (million passenger-km) in Myanmar

Mode	2018
Aviation	1697.493389
Rail	29067.48735
Road	48134.70255

1.4 Freight transport activity

Information on freight activity for Myanmar has been retrieved for rail, road, waterways, and domestic aviation. 158 million tonnes-km were recorded by road, 362 million tonnes-km by rail, 49 million tonnes-km by waterways, and 5 million tonnes-km by aviation. The data is curated by the Asian Development Bank's Asian Transport Outlook Database.

Table 3: Recorded freight transport activity (million tonnes-km) in Myanmar

Mode	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Road	507.93	508.2	514.3	512.13	495.42	419.41	326.78	295.35	317.19	158.44
Rail	1059.351	1123.075	1161.723	968.671	828.826	812.327	765.434	703.55	677.851	362.821
Waterways	1105.95	1212.94	836.66	534.31	455.63	454.4	302.24	177.34	102.54	49.65
Aviation	1.28	2.55	4.1	4.68	5.18	5.05	16.15	19.59	14.88	5.06

Freight data is provided on an annual basis from 2004 to 2019.

According to the UN DESA modelled data, freight activity for 2018 in Myanmar is 21667 million tonnes-km. It covers the same freight transport modes as the country's statistics, but the differences are significant. The estimates by UN DESA are four times higher than the country's statistics. Waterways are seen as more relevant than rail and roads are assumed to be the main transport mode.

Table 4: Modelled freight transport activity (million tonnes-km) in Myanmar

Mode	2018
Aviation	4.74216
Inland waterways	4913.668
Rail	3991.449
Road	12757.24

1.5 Vehicle fleets

There are 7 million road vehicles in Myanmar, as of 2019. Official records cover information from 2004 to 2019. During this period, the total vehicle fleet grew by 1368%. The largest growth was recorded for light-duty vehicles. The vehicle fleet data is sourced from the Asian Development Bank's Asian Transport Outlook Database.

Table 5: Vehicle fleet numbers in Myanmar

Mode	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Two-wheelers	1749083	1883958	1955505	3219213	3595474	4276696	4631107	5271105	5690773	5889577
Three-wheelers	8876	43823	37308	35036	35647	42602	74272	84405	97326	100758
Light-duty vehicles	245921	265642	249561	292919	382774	429493	462199	512144	530728	536647
Buses	19807	20944	19579	19812	22151	26746	25937	26801	28010	27552
Freight vehicles	61132	64888	67750	74546	124596	193559	250530	322533	374287	399474
Total road vehicles	2147404	2308521	2363747	3699109	4237682	5077699	5541361	6337002	6853995	7092843

2. Methodology

The focus is on national data for passenger activity (passenger-km), freight activity (tonnes-km) and modes of transport (number of vehicles). The priority is to collect data released by national governments, government-affiliated organisations, or country-specific studies. The research identifies the most recent available data and any data available from 1990 onwards. The priority was for any data after 2010, because transport is a very dynamic growth sector and anything before 2010 adds limited value to understanding the current real-world situation.

Desk research is the main data collection approach for the Transport Starter Data Kits. The desk research examined annual yearbooks, transport statistics, country reporting, and any national statistical portals. Websites of the national government, transport ministries, statistical institutes and other related authorities were examined. Only when severe data gaps exist, global datasets are consulted. In some cases, World Bank data[3] on rail passenger and rail freight is included.

Each Transport Data for Starter Data Kit set contains an additional dataset, which is sourced from the United Nations Department of Economic and Social Affairs (UN DESA) Statistics Division. It is included as a secondary priority because this dataset is the result of a modelling exercise and covers every country. The UN DESA modelled passenger activity and freight activity has the purpose to support the Sustainable Development Goal Indicator 9.1.2[4]. The passenger activity provides information for road, rail, and air transport. Freight data covers the road, rail and inland water, and aviation. The passenger-km and tonnes-km data originate from the Open Sustainable Development Goals (SDG) Data Hub. In the UN DESA dataset, only the data for countries participating in the International Transport Forum (ITF) (representing mostly member countries of the Organisation for Economic Co-operation and Development (OECD)) and the United Nations Economic Commission for Europe (UNECE) (mostly European countries) are based on national reporting. For non-ITF/UNECE countries, data are estimated using the ITF model, which uses several covariates such as gross domestic product, population, and transport network coverage. A description of the model can be found in the ITF Transport Outlook 2017[5]. The UN DESA dataset is included in the Transport Data for Starter Data Kits as additional tables to fill in the incomplete picture that most countries present. The UN DESA modelled data is less accurate and it shall only be regarded as offering the wider picture of transport activity in the country.

The collected data have been shared with a group of relevant SLOCAT partners to validate and explore any additional sources. The SLOCAT partners were selected based on their actions to lead projects in the region and their involvement in data-focused knowledge products or projects. The consultation involved ten anonymous organisations.

Desk research is an approach that limits the research to material available on the internet, accessible through search engines and linked to government and statistical institutes' websites. However, this does not pose a major limitation to obtaining data. Nearly every country has functional websites for statistics and transport authorities. In a few cases, websites are not well maintained, resulting in missing or broken hyperlinks to reports. By using services that provide access to archived websites, some of these broken pages can be retrieved. The collected information has been shared with partners and no additional information has been received.

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[3] Rail passenger data: World Bank, 2022, Railways, passengers carried (million passenger-km), https://data.worldbank.org/indicator/IS.RRS.PASG.KM; rail freight data: World Bank, 2022, Railways, goods transported (million ton-km), https://data.worldbank.org/indicator/IS.RRS.GOOD.MT.K6
[4] UN DESA, 2021, Indicator 9.1.2: Freight volume by mode of transport (tonne kilometres): https://www.sdg.org/datasets/undesa::indicator-9-1-2-freight-volume-by-mode-of-transport-tonne-kilometres/about ;
UN DESA, 2021, Indicator 9.1.2: Passenger volume (passenger kilometres) by mode of transport: https://www.sdg.org/datasets/undesa::indicator-9-1-2-passenger-volume-passenger-kilometres-by-mode-of-transport/about
[5] ITF, 2017, ITF Transport Outlook 2017, https://www.itf-oecd.org/transport-outlook-2017

Government datasets are generally published in local languages. For this study, the relevant information is accessed through the Asian Transport Outlook Database[6] which is available in English, thus no language issues were encountered.

Due to missing values in the country's historical GDP data, extrapolation between available years was done by the authors to address this. The World Bank's data platform provided GDP share by sector for agriculture, manufacturing, and services. However, GDP share by construction, mining, and energy was also needed to align the data structure with the MAED tool. To address the lack of data available for these sectors, the authors assumed that construction, mining, manufacturing, and energy all fall within the industry sector. Thus, to obtain data for the three remaining sectors, the remaining percentage after considering agriculture, manufacturing, and services from The World Bank's data platform, was divided by three. It is therefore assumed that the GDP share of the construction, mining, and energy sectors are the same. Further, GDP share data before 2000 was not available. Thus, the authors addressed this by calculating an average from the years available and assumed the years before 2000 had a GDP share similar to this. An extrapolation into earlier years was not done as this gave unrealistic values.

3. Ethics Statement

Not applicable.

4. CRediT Author Statement

Naomi Tan: Investigation, Conceptualisation, Methodology; Data Collection; Visualization, Writing and Editing; **Robert Ambunda:** Data Collection; Investigation; Writing and Editing; **Nikola Medimorec:** Conceptualisation; Methodology; Data Collection; Investigation; Writing, Review & Editing; Supervision; **Angel Cortez:** Data Collection; **Agustina Krapp:** Data Collection; **Erin Maxwell:** Data Collection; **John Harrison:** Supervision; **Mark Howells:** Supervision

Acknowledgements

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[6] ADB, 2021, Asian Transport Outlook Database, https://data.adb.org/dataset/asian-transport-outlook-database

Declaration of Competing Interests

The authors declare that they have no known competing financial interests or personal relationships which have or could be perceived to have influenced the work reported in this article.