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

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Abstract

Guinea is located in the western part of Africa, on the Atlantic Ocean. Guinea is bordered by Guinea Bissau to the northwest, Senegal to the north, Mali to the northeast, Cote D'ivoire to the southeast, and Liberia and Sierra Leone to the south. Guinea covers a land area of 245857 square kilometres and has a population of 13.53 million inhabitants. Guinea is a lower middle-income country with agriculture and other rural activities accounting for three-fourths of the country's employment.

Guinea's transport infrastructure consists of railways, highways, waterways and aviation. The vehicle fleet is relatively old and the majority of people require taxis to ensure mobility.[1] On climate action, Guinea puts a strong focus on sustainable transport, such as the implementation of bus rapid transit, biofuels, better transport planning and expansion of infrastructure.[2]

Transport demand modelling can be used to assess the implications of different scenarios and support improved policymaking. 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 Guinea, 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.

[1] https://en.wikipedia.org/wiki/Transport_in_Guinea

[2] https://changing-transport.org/ndc_country/Guinea/

Keywords

U4RIA

Transport data

Transport modelling

MAED

Guinea

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 Guinea
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.7997959

Value of the Data

- These data can be used to develop national transport demand models to inform national transport investment outlooks and policy plans, as well as provide insights on the evolution of total final energy demand.
- The data are useful for country analysts, policy makers, and the broader scientific community, as a zero-order starting point for model development.
- These 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 the country's power system.
- The data can be used for conducting an analysis of transport activity and capacity-building activities. Additionally, the methodology of translating the input data into modelling assumptions for a demand projection tool is presented in this article, which is useful for developing a zero-order national transport demand model. This is consistent with the U4RIA goals.
- The data can also 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 as input data to develop transport demand models for Guinea. The data provided in this paper can be used to support the development of a transport model for Guinea. 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 sub-types 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 Guinea.
Figure 2	A graph showing total GDP (million USD in 2015), as well as the share of the different sectors contributing to GDP in Guinea: agriculture, construction, mining, manufacturing, service, and energy.
Table 1	A table showing passenger transport activity in Guinea based on UN DESA Statistics Division data (see explanation below). The data feature information for 2019.
Table 2	A table showing freight transport activity in Guinea based on UN DESA Statistics Division data (see explanation below). The data feature information for 2018.
Table 3	A table showing the energy intensity levels (MJ per passenger-km) for urban transport in 2013. It is based on a study for Cape Town (South Africa) and it is intended to support estimations for this parameter in the country.
Table 4	A table showing load factors (average number of people per vehicle) for urban transport in 2013, based on the same study for Cape Town (South Africa).
Table 5	A table showing vehicle fleet data in Guinea for the most recent year data was available.

For the parameters on passenger and freight transport activity, an additional dataset was included in Table 1 and Table 2. The UN DESA Statistics Division modelled passenger activity and freight activity for every country in support of SDG Indicator 9.1.2[3]. Passenger activity data provide information for road, rail and air transport. Freight data cover road, rail and inland water, 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

[3] UN DESA (2020), Indicator 9.1.2: Freight volume by mode of transport (tonne kilometres), https://unstats-undesa.opendata.arcgis.com/datasets/4a5d7189e27148c48f045729ef9e40c8_0/about;
UN DESA (2020), Indicator 9.1.2: Passenger volume (passenger kilometres) by mode of transport, https://hub.arcgis.com/datasets/undesa::indicator-9-1-2-passenger-volume-passenger-kilometres-by-mode-of-transport-5/about

(mostly European countries) are based on national reporting. For non-ITF/UNECE countries, the data are 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[4]. Figure 1 displays the total population disaggregated by urban and rural in Guinea.

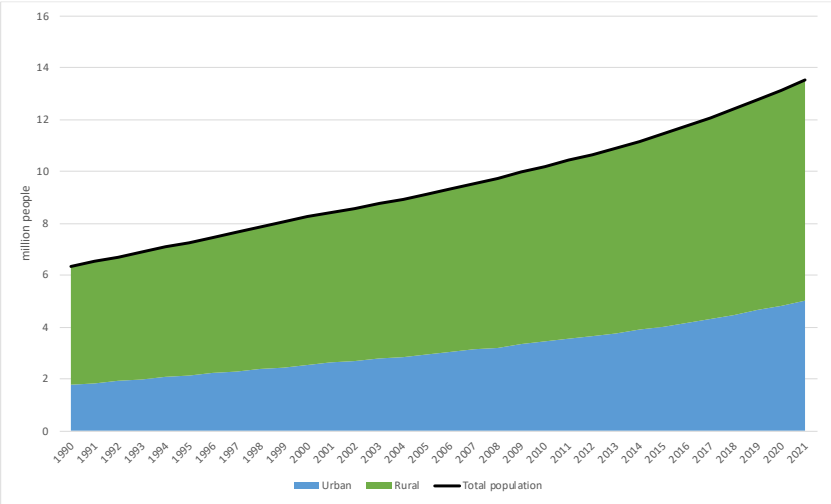

Figure 1: Total population (million people) disaggregated by urban and rural in Guinea

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[4]. Where data was not available, data processing was done. Figure 2 shows the total GDP, as well as the share by sector, in Guinea.

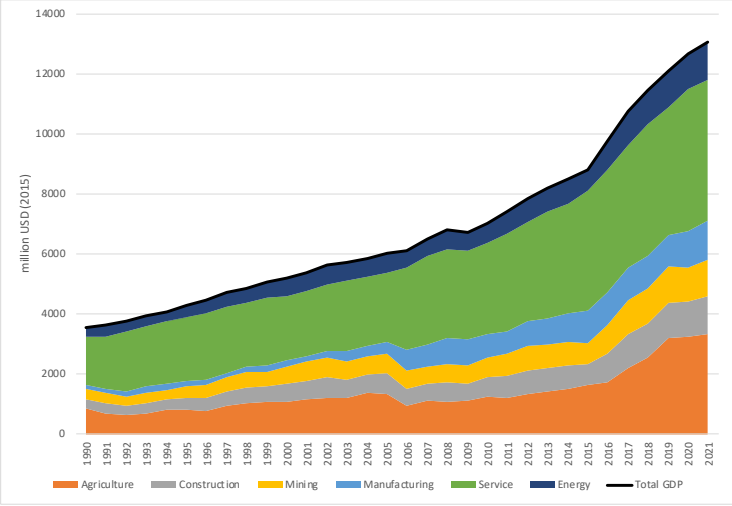

Figure 2: Total GDP (million USD in 2015) disaggregated by share in Guinea

[4] https://data.worldbank.org/

1.3 Passenger transport activity

Guinea has severe data gaps. The country reporting does not cover any of the data points. Information on passenger transport activity in Guinea is not released by country statistics. The World Bank Data Portal does not either provide information on rail passenger activity.

According to the UN DESA modelled data, it is estimated that the passenger activity in Guinea recorded over 21042 million passenger-km for road and 5135 million passenger-km for rail in 2019. The large majority of passenger activity is conducted through road transport.

Table 1: Modelled passenger transport activity (million passenger-km) in Guinea

Mode	2019
Rail	5135.333333
Road	21042.15556

Source: UN DESA (2020), Indicator 9.1.2: Passenger volume (passenger kilometres) by mode of transport, https://hub.arcgis.com/datasets/undesa::indicator-9-1-2-passenger-volume-passenger-kilometres-by-mode-of-transport-5/about, last accessed April 2022.

1.4 Freight transport activity

Freight transport activity is not reported by any of the relevant sources.

The UN DESA modelled data estimates that freight activity through roads surpasses 3214 million tonnes-km for 2019. Rail is assumed to transport 17.8 million tonnes-km in 2019.

Table 2: Modelled freight transport activity (million tonnes-km) in Guinea

Mode	2018
Rail	17.8
Road	3214.2

Source: UN DESA (2020), Indicator 9.1.2: Freight volume by mode of transport (tonne kilometres), https://unstats-undesa.opendata.arcgis.com/datasets/4a5d7189e27148c48f045729ef9e40c8_0/about, last accessed April 2022.

1.5 Energy intensities for transport

To further understand the efficiency of the transport system, information on the transport energy intensity is relevant. It is together with load factors (see *1.4 Load Factors*) inputs to MAED. However,

such information is difficult to retrieve and there were no values available for this country. A study on urban transport in Cape Town (South Africa) provides estimates for some road transport modes.[5]

Table 3: Energy intensity levels (MJ per passenger-km) for urban transport

Mode	MJ per passenger-km for 2013
Electric Car	0.55
Hybrid Car	1.56
Petrol Car	2.22
Minibus taxi (petrol)	0.66

Source: Kane, L. (2016), What do we mean by low carbon transport: Understanding how people move in Cape Town, https://www.researchgate.net/publication/308899067_What_do_we_mean_by_low_carbon_transport_Understanding_how_people_move_in_Cape_Town

1.6 Load factors

The load factors in the Starter Data Kits for Transport focuses on the average number of people transported by one unit in each transport mode. For example, for a bus, it is the average number of people per trip. In some cases, it might be also referred to as 'occupancy levels' for passenger transport. There were no values available for the country, but a study for urban transport in Cape Town (South Africa) provides some insights that can support estimating values in other cities or countries.

Table 4: Load factors

Mode	Load factors for 2013
Electric Car	1.4
Hybrid Car	1.4
Petrol Car	1.4
Minibus taxi (petrol)	7.8

Source: Kane, L. (2016), What do we mean by low carbon transport: Understanding how people move in Cape Town, https://www.researchgate.net/publication/308899067_What_do_we_mean_by_low_carbon_transport_Understanding_how_people_move_in_Cape_Town

[5] Kane, L. (2016), What do we mean by low carbon transport: Understanding how people move in Cape Town, https://www.researchgate.net/publication/308899067_What_do_we_mean_by_low_carbon_transport_Understanding_how_people_move_in_Cape_Town

1.7 Vehicle fleet

Guinea has a total of 333243 road vehicles, as of 2019. Records cover information from 2015 to 2019. During this period, the total vehicle fleet grew significantly. The vehicle fleet data is sourced from the IRF World Road Statistics 2022.

Table 5: Vehicle fleet in Guinea

Year	Value
2015	225620
2016	248253
2017	273510
2018	301716
2019	333243

Source: IRF (2023), World Road Statistics 2022, International Road Federation, https://worldroadstatistics.org/

2. Experimental Design, Materials, and Methods

The above data were gathered through extensive desk research. This included material from international organisations, journal articles, and media reports. 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. The transport data was also compiled, presented, and discussed with local stakeholders to reach a consensus on the main data and assumptions.

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

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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.