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

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Abstract

Algeria is the largest country on the African continent and the tenth largest in the world. It covers an area of 2,381,741 square kilometres and has a population of 44 million inhabitants (ninth-most populous in Africa and 32nd most populous country in the world). The majority of inhabitants and infrastructure exists in the northernmost region (generally known as the Tell), which consists largely of the Atlas Mountains and is subject to moderating influences of the Mediterranean. The southernmost region, which is almost entirely desert, forms the majority of the country's territory. Algeria has the highest Human Development Index of all mainland African countries[1], with an economy (one of the largest economies on the continent) largely dominated by exports in petroleum and natural gas commodities (energy exports), which annually roughly contribute one-third of the country's gross domestic product (GDP).[2]

Regarding transport, Algeria faces several challenges, such as inadequate infrastructure and very limited public transport services. The majority of transport is conducted by road transport, lacking efficiency and safety.[3] In the country's Nationally Determined Contribution the only activity on transport is an increase of liquefied petroleum gas and natural gas in fuel consumption until 2030.[4]

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

[1] https://algeriainvest.com/news/human-development-index-hdi-algeria-ranking
[2] https://en.wikipedia.org/wiki/List_of_African_countries_by_GDP_(nominal)
[3] https://en.wikipedia.org/wiki/Transport_in_Algeria
[4] https://changing-transport.org/ndc_country/algeria/

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 Algeria, 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

Algeria

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 Algeria
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.7997446

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 Algeria. The data provided in this paper can be used to support the development of a transport model for Algeria. 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 Algeria.
Figure 2	A graph showing total GDP (million USD in 2015), as well as the share of the different sectors contributing to GDP in Algeria: agriculture, construction, mining, manufacturing, service, and energy.
Table 1	A table showing passenger transport activity in Algeria 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 Algeria 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 Algeria for the most recent year data was available. The data are curated from national statistics agencies or other government-affiliated agencies.
Table 4	A table showing freight transport activity in Algeria based on UN DESA Statistics Division data (see explanation below). The data feature information for 2018.
Table 5	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 6	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 7	A table showing vehicle fleet data in Algeria for the most recent year data was available.

For the parameters on passenger and freight transport activity, an additional dataset was included in Table 2 and Table 3. The UN DESA Statistics Division modelled passenger activity and freight activity for every country in support of SDG Indicator 9.1.2[5]. 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 (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[6]. Figure 1 displays the total population disaggregated by urban and rural in Algeria.

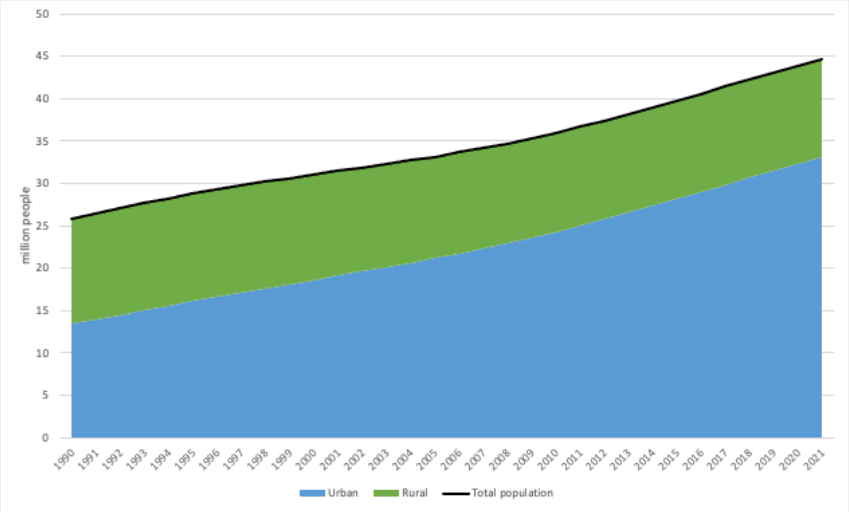

Figure 1: Total population (million people) disaggregated by urban and rural in Algeria

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

[5] 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

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

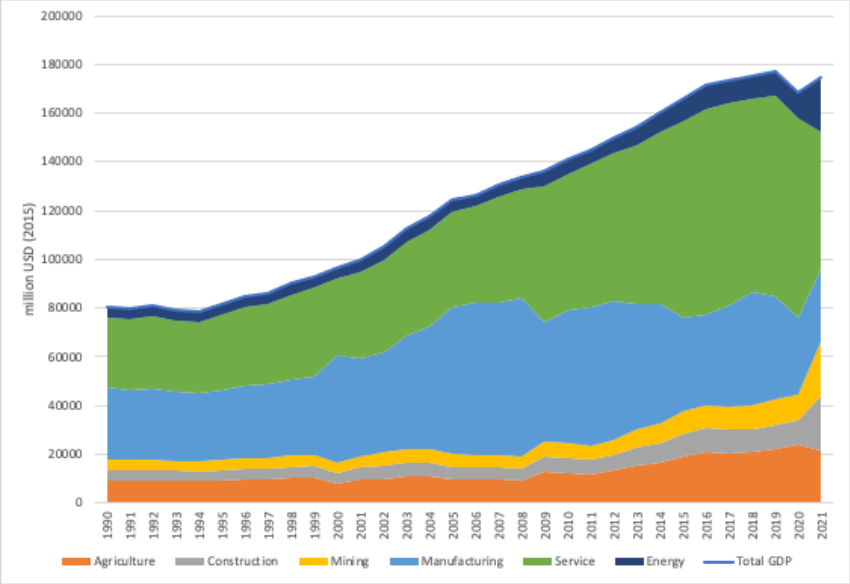

Figure 2: Total GDP (million USD in 2015) disaggregated by share in Algeria

1.3 Passenger transport activity

Algeria has several data gaps. The country reporting does not cover most of the data points. Information on passenger transport activity in Algeria could not be found in the country's statistics reports. The World Bank Data Portal provided information on rail passenger activity. The country has a rail network (standard gauge) spanning over 4500 km, with 480 km of the network being electrified and 560 km of that being double tracked[7] . A study published by the World Bank provides information on rail passenger activity from 2000 to 2018 (Table 1). It is estimated that The Country's rail service recorded 1602 million passenger-km in 2018.

Table 1: Passenger transport activity (million passenger-km) in Algeria

Mode	Year	Passenger Activity (million passenger-km)
Rail	2000	1142
Rail	2000	1142
Rail	2001	981
Rail	2002	955
Rail	2003	964
Rail	2004	950
Rail	2005	929
Rail	2006	821
Rail	2007	758
Rail	2008	937
Rail	2009	1141

[7] Wikipedia, 2022, Transport in Algeria, https://en.wikipedia.org/wiki/Transport_in_Algeria

Rail	2010	1045
Rail	2011	1040
Rail	2012	1141
Rail	2014	1186
Rail	2015	1269
Rail	2016	1337
Rail	2017	1550
Rail	2018	1602

Source: The World Bank, https://data.worldbank.org/indicator/IS.RRS.PASG.KM?end=2018&locations=DZ&start=1995

According to the UN DESA modelled data, it is estimated that the passenger activity in Algeria recorded over 196673 million passenger-km for road, 24509 million passenger-km for rail and 8186 million passenger-km for air in 2019. The large majority of passenger activity is conducted through road transport.

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

Mode	2019
Aviation	8186.91
Rail	24509.94
Road	196673.21

Source: UN DESA (2021), Indicator 9.1.2: Passenger volume (passenger kilometres) by mode of transport, Open SDG Data Hub, https://www.sdg.org/datasets/undesa::indicator-9-1-2-passenger-volume-passenger-kilometres-by-mode-of-transport/about, last accessed April 2022.

1.4 Freight transport activity

The latest available information on freight activity for Algeria has been retrieved for rail, road, and domestic aviation. Rail was found to represent 1026 million tonnes-km in 2018, road 1822 million tonnes-km in 2011, and aviation 16 million tonnes-km in 2020. The data was provided by multiple relevant sources. For rail and aviation, data was provided by the World Bank (Rail Data and Aviation Data) and road data was provided by the African Development Bank Group (Road Data).

Table 3: Freight transport activity (million tonnes-km) in Algeria

Mode	Various years
Aviation	16 (2020)
Rail	1026 (2018)
Road	1822 (2011)

Freight transport activity for rail and road were not reported by any of the relevant sources.

The UN DESA modelled data estimates that freight activity through roads surpasses 34220 million tonnes-km for 2019. Rail and Air (Aviation) were assumed to transport 8450 million tonnes-km and 26 million tonnes-km in 2019 respectively.

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

Mode	2019
Aviation	78.15964
Rail	1814.86639
Road	8029.911878

Source: UN DESA (2021), Indicator 9.1.2: Freight volume by mode of transport (tonne kilometres), Open SDG Data Hub, https://www.sdg.org/datasets/indicator-9-1-2-freight-volume-by-mode-of-transport-tonne-kilometres-5?geometry=-79.979%2C-66.041%2C82.443%2C82.647, 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.[8]

Table 5: 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

[8] 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

Town (South Africa) provides some insights that can support estimating values in other cities or countries.

Table 6: Load factors (average number of people per vehicle)

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

1.7 Vehicle fleet

There are 4.2 million registered passenger cars as of 2019. Data cover information from 2008 to 2019. During this period, the passenger car fleet almost doubled. The data is sourced from the CEIC.

Table 7: Vehicle fleet in Algeria

Mode	2015	2016	2017	2018
Passenger cars	3655033	3872709	3984250	4151041

Source: CEIC (2023), Algeria Land Transport: Number of Vehicles: Registered: Passengers Cars, https://www.ceicdata.com/en/algeria/land-transport-number-of-vehicles/land-transport-no-of-vehicles-registered-passengers-cars

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.