

# ***Transport Starter Data Kit: Historical socio-transport data for Mauritania***

## **Authors**

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## **Abstract**

Mauritania is located on the Atlantic coast of Africa. The country covers a land area of 1.031 square kilometres and much of it encompasses the Sahara Desert (90 % of the land area), which borders the country to the northwest. Mauritania is also bordered by Mali to the east and southeast, and by Senegal to the southwest. The Atlantic coastline bordering Mali to the west extends by 700 kms. The country has a population of 4.4. million inhabitants, about half of which live in and around urban centres. Mauritania's economy is predominantly subsistence, focused around agriculture and livestock farming. The country has an extensive deposit of iron ore, with exports from the mineral accounting for 50 % of all exports from the country.<sup>1</sup>

Transport in Mauritania offers an extensive road network, ports and railways. The climate makes road maintenance and repair very challenging. Public transport is seen as not safe and roads are in a poor condition. The railways are mostly designed for freight transport (for iron ore).<sup>2</sup>

The Nationally Determined Contribution by Mauritania considers the expansion of freight and passenger transport, electric mobility and natural gas-powered transport. A tramway project is being proposed in Nouakchott.<sup>3</sup>

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

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<sup>1</sup> <https://en.wikipedia.org/wiki/Mauritania>

<sup>2</sup> [https://en.wikipedia.org/wiki/Transport\\_in\\_Mauritania](https://en.wikipedia.org/wiki/Transport_in_Mauritania)

<sup>3</sup> [https://changing-transport.org/ndc\\_country/mauritania/](https://changing-transport.org/ndc_country/mauritania/)

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 Mauritania, 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

Mauritania

### Specifications Table

<b>Subject</b>	Transport
<b>Specific subject area</b>	Transport Data
<b>Type of data</b>	Tables Graphs
<b>How data were acquired</b>	Literature survey (databases and reports from international organisations; journal articles)
<b>Data format</b>	Raw and analysed
<b>Parameters for data collection</b>	Data collected based on inputs required to create an energy system model for Mauritania
<b>Description of data collection</b>	Data were collected from the websites, annual reports and databases of international organisations, as well as from academic articles and existing modelling databases.
<b>Data source location</b>	Not applicable
<b>Data accessibility</b>	With the article and in a repository. Repository name: Zenodo. Direct URL to data: <a href="https://doi.org/10.5281/zenodo.7997601">https://doi.org/10.5281/zenodo.7997601</a>

### 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 Mauritania. The data provided in this paper can be used to support the development of a transport model for Mauritania. 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).

<i>Item</i>	<i>Description of Content</i>
Figure 1	A graph showing total population (million people), as well as the share of urban and rural population in Mauritania.
Figure 2	A graph showing total GDP (million USD in 2015), as well as the share of the different sectors contributing to GDP in Mauritania: agriculture, construction, mining, manufacturing, service, and energy.
Table 1	A table showing passenger transport activity in Mauritania for the most recent year data were available. The data are curated from national statistics agencies or other government-affiliated agencies.
Table 2	An additional table showing passenger transport activity in Mauritania based on UN DESA Statistics Division data (see explanation below). The data feature information for 2019.
Table 3	A table showing freight transport activity in Mauritania for the most recent year data were available. The data are curated from national statistics agencies or other government-affiliated agencies.
Table 4	A table showing freight transport activity in Mauritania based on UN DESA Statistics Division data (see explanation below). The data feature information for 2019.
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).

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 SDG Indicator 9.1.2<sup>4</sup>. 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<sup>5</sup>. Figure 1 displays the total population disaggregated by urban and rural in Mauritania.

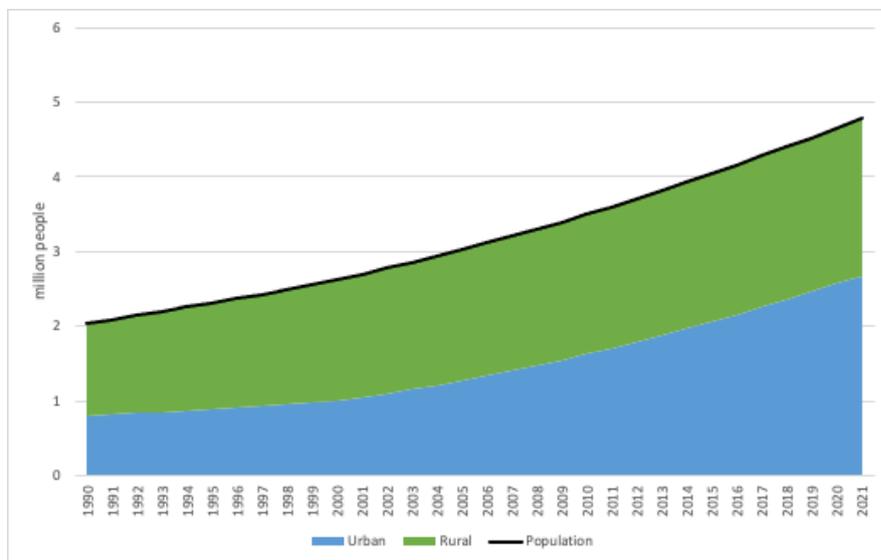


Figure 1: Total population (million people) disaggregated by urban and rural in Mauritania

## 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<sup>5</sup>. Where data was not available, data processing was done. Figure 2 shows the total GDP, as well as the share by sector, in Mauritania.

<sup>4</sup> 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](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>

<sup>5</sup> <https://data.worldbank.org/>

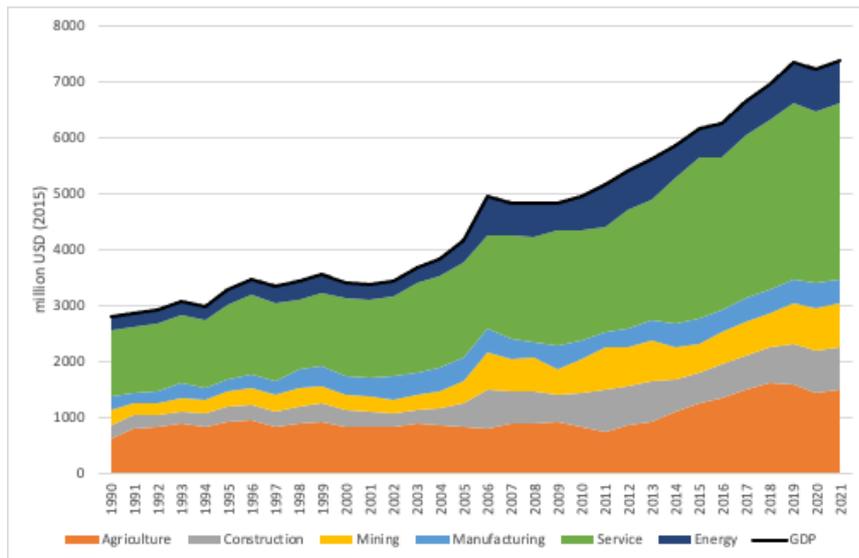


Figure 2: Total GDP (million USD in 2015) disaggregated by share in Mauritania

### 1.3 Passenger transport activity

Mauritania has severe data gaps. The country reporting does not cover any of the data points. Information on passenger transport activity in Mauritania is not released by country statistics. The World Bank Data Portal only provides information on rail passenger activity, with the latest information recorded in 2008. The country has a single rail line spanning 717 kms. Data recorded by the World Bank provides information on rail passenger activity for 2007 and 2008 (Table 1). It is estimated that Mauritania's rail service recorded 47 million passenger-km in 2008.

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

Mode	2007	2008
Rail	47	47

Source: The World Bank, Railways, passengers carried (million passenger-km) - Mauritania, World Bank Data Portal, <https://data.worldbank.org/indicator/IS.RRS.PASG.KM?locations=MR>, last accessed December 2022.

According to the UN DESA modelled data, it is estimated that the passenger activity in Mauritania recorded over 11059 million passenger-km by road, 5165 million passenger-km by rail, and 412 million passenger-km by aviation in 2019. The large majority of passenger activity is conducted through road transport.

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

Mode	2019
Aviation	412.84997
Rail	5165.085714
Road	11059.52857

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

Information on freight activity for Mauritania has been retrieved for rail and aviation. The African Development Bank recorded that rail transported 7536 million tonnes-km in 2012. The African Development Bank also recorded that aviation transported 0.14 million tonnes-km in 2011.

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

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

Mode	2011	2012
Aviation	0.14	-
Rail	-	7536

Aviation Source: African Development Bank: Aviation freight volume by mode of transport (million tonne kilometres), Open Data for Africa, <https://mauritania.opendataforafrica.org/data/#menu=topic>, last accessed December 2022.

Rail Source: African Development Bank: Rail freight volume by mode of transport (million tonne kilometres), Open Data for Africa, <https://mauritania.opendataforafrica.org/data/#menu=topic>, last accessed December 2022.

The UN DESA modelled data estimates that freight activity through roads surpasses 1349 million tonnes-km for 2019.

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

Mode	2019
Road	1349.88

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](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.<sup>6</sup>

**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](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 6: 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](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 is no information in any source (official government records nor global databases) available on the vehicle size or number of registered vehicles per year.

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<sup>6</sup> 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](https://www.researchgate.net/publication/308899067_What_do_we_mean_by_low_carbon_transport_Understanding_how_people_move_in_Cape_Town)

## 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.