The World Bank

Mauritania Transport Policy Note

Executive Summary

Mauritania, a country sparsely populated of 4.5 million people and a sustained growth of 60.4 percent in its urbanization rate, increasingly relies on enhancements in its transport connectivity among and within its urban areas to realize its economic potential and the improvement of its human capital indicators. Indeed, 90 percent of goods are transported by road, as so do 80 percent of passengers. Thirty five percent of Mauritania's population lives in Nouakchott. Connectivity within the city is challenging leaving many away from economic opportunities. In this context, the Government of Mauritania and the World Bank held exchanges and discussions over the last ten months towards the identification and analysis of challenges and opportunities in transport connectivity focusing largely on road maintenance and urban mobility in Nouakchott. This note summarizes the results of those exchanges and discussions.

Road Maintenance

The current road classification is based on a 1968 law that states that Mauritania's road network is 11,000 km long, with approximately 5,935 km of paved roads. The general condition of the network is not fully known due to lack of data, particularly on feeder/rural roads. For paved roads, the condition is considered satisfactory with about 75 percent in good to acceptable condition, compared to an average of 65 percent for paved roads in other Western African countries.

The lack of a reliable road database prevents an appropriate and evidence-base analysis of the road network. For instance, traffic on the road network is not known, due to the lack of regular road counts, with the last counting campaign on the entire road network conducted in 2005. Similarly, there are no consistent indicators to measure and define pavement performance in the programming and implementation of maintenance activities. Furthermore, road safety indicators are limited, and they are not considered in the definition of maintenance programs.

In addition, the method of manual or multi-year programming of road maintenance works is purely indicative and often unreliable, inaccurate, or incomplete. The works items are indicated with global amounts without precise references to the roads concerned. The amount of resources needed to ensure the required routine and periodic maintenance is not well defined. As a result, maintenance costs are 45 percent higher in Mauritania than in other Western African countries.

These shortcomings are associated with institutional and financial weaknesses, including lack of consistency in the allocation of responsibilities among various government structures and the appropriate revision of the classification of roads among government levels. Indeed, even where structures are in place, the recurrent changes in the roles and responsibilities of the different entities do not facilitate the continuous execution of the different activities.

With decentralization, responsibility for road maintenance has been shared between the central government and local government. However only the central government has resources for road maintenance, leaving much of the road network without proper maintenance. All this calls for a review of the current assignment of responsibilities upon the revision of the criteria for the classification of the road network, including urban roads.

On funding for the preservation of road assets, despite a significant increase in financial resources allocated for routine and periodic road maintenance since 2002, annual expenditures continue to fall short of the requirements for routine and periodic road maintenance. On average, over the last ten years, the resources generated by user fees each year (excluding fuel taxes) cover only about 16 percent (mainly from mining companies) of its estimated maintenance funding needs. This lack of resources

jeopardizes the long-term sustainability of the government's investment in new road construction.

The case of Nouakchott

While all urban communes need better infrastructure, in Nouakchott, with one third of the national population, connectivity constraints have significant costs for the country's economy. Because of its rapid development and a significant imbalance in the spatial distribution of economic activities and services, the need for travel has continued to increase and the deficient conditions for meeting this need have a major impact on access to opportunities and improving the quality of life of the population.

Urban transport responsibilities for the Nouakchott urban area are particularly dispersed and not clearly defined; there is also a lack of a solid institutional framework to coordinate different institutions. There is an unclear definition of mandates especially between the General Directorate of Land Transport (DGTT), the Authority of Regulation and Organization of Road Transport (AROTR), and the Region of Nouakchott. Examples of lack of clarity of mandates between different institutions can be found on urban transport planning, organization of the provision of public transport services, and on traffic and parking management. Since the creation of the Region of Nouakchott in 2018, the mandate of the Region on urban mobility is unclear, as the mandate on urban mobility of the former Community of Nouakchott has not been explicitly transferred to the Region.

The poor condition of infrastructure for motorized and non-motorized road infrastructure and the deficient provision of transport services contribute to the existing lack of access, chiefly: (a) road infrastructure investments have not kept pace with Nouakchott's rapid urban population growth, leaving some peripheral and poor neighborhoods largely disconnected from the center that accounts for most jobs; (b) even though most people walk, pedestrian facilities are generally absent, as urban road improvements have often ignored the needs of pedestrians; and (c) public transport in Nouakchott is provided by both the public and private sectors, with the informal sector dominating the transport service provision, mainly by shared taxis. The lack of organization of public transport contributes to competition in the market, leading to negative externalities such as road safety and air quality and negatively add to congestion and the overall low-quality services.

Way Forward

This note lays out guiding actions (in the short and medium term) to help move forward road maintenance and urban transport in Nouakchott. Such actions will be further detailed as analysis and discussions evolve with the Mauritanian authorities.

Table 1: Guiding the way forward

Actions		
	Short Term	Medium/Long Term
Urban Mobility in Nouakchott		
Axis 1. Strengthening the institutional and legal framework of urban transport	Study/Assess the options to put in place an institutional coordination framework.	Putting in place the institutional coordination framework in the form of a Transport Authority or similar.
Axis 2. Enhancing the regulatory framework of public transport	Plan for a professionalizing of existing services under a sustainable business model.	Implementation of program for the professionalization of informal operators (minibuses, taxis, etc.). Pilot enhancement with higher quality public transport in selected

	Invest in maintaining rolling stock, keeping levels of service of public transport provided by STP.	corridors.
Axis 3. Enhancing non-motorized transport	Invest in quality network of sidewalks, pedestrian-centered traffic management and crossings to enhance local connectivity to communities and integration with other modes such as public transport.	Maintain a medium-term plan to invest in high quality sidewalks, pedestrian-centered traffic management and crossings.
Axis 4. Improving road density into periphery neighborhoods	Improve road infrastructure in the periphery, including paving, rehabilitation, and maintenance.	Supplying the missing gaps in the road network hierarchy to provide a balance between main, secondary, tertiary and community roads.
Axis 5. Enhancing traffic and parking management	Prepare traffic and parking policy and plans. Enhance technical skills in traffic and parking management.	Implement traffic and parking policy and plans.
Axis 6. Enhancing capacity in the public and private sector	Design and implement capacity building programs for both government and private sector providers.	Implement capacity building programs for both government and private sector.
Axis 7. Exploring new sources of finance to respond to major urban mobility requirements	Explore additional sources of financing for the sector, including private sector participation.	Pilot projects with innovative financing options, including PPPs.
Road Asset Management		
Axis1: Strengthening the legal and regulatory framework	Update the following texts: (i) Law No. 68-244 of July 30, 1968, creating a national road network and establishing the regime of the network's public domain; (ii) Decree No. 68-288 of October 5, 1968 on the creation and classification of the road network.	
Axis 2: Filling gaps in road planning	(i) Implement a regular traffic counting system at least two (2) times per year; (ii) Create and regularly update the Road Database; (iii) Monitor road surface conditions; (iv) Establish road maps to locate all roads.	(i) Produce a Maintenance Operations Manual; (ii) Implement digital transport applications by developing GIS-enabled applications for geo-mapping of rural networks; (iii) Adopt a resilience strategy.
Axis 3: Compliance with axle load regulations	(i) Setup an ad hoc committee with all the stakeholders (ii) Application of the regulations; (iii) Identification of any accompanying measures.	(i) Implementation of a communications plan.

Axis 4: Improving funding mechanisms for road maintenance	(i) Revision and review of the draft decree on the organization and operation of the FSER; (ii) Increase resources.	Diversify maintenance funding sources.
Axis 5: Monitoring the state of the network	Define relevant indicators.	Conduct a comprehensive inventory of the road network.
Axis 6: Implementation ofroad maintenance programs	(i) Implement a management system such as HDM4 or RONET and/or RED; (ii) Define a maintenance program based on road data and planning tools.	Promotion of multi-year performance-based contracts.
Axis 7: Performance measurement Framework	(i) Setup a baseline on the road quality; (ii) Put in place a monitoring and evaluation system.	Production of regular reports.
Axis 8: Road safety and capacity building	(i) Study of an iRAP in the national road network; (ii) Creation of a National Road Safety Agency, (iii) Study of a Road safety pilot; (iv) Development of an awareness and communication plan and monitoring of its implementation; (v) Capacity building for existing departments.	Implement an action plan for the implementation of reforms and the awareness and communication plan.

List of acronyms

AROTR	Authority of Regulation and Organization of Road Transport
ATTM	Company of Sanitation, Works, Transport and Maintenance
BCR	Road Control Office
BDR	Road Data Bank
BGR	Road Management Office
WB/ Bank	World Bank
BTP	Construction & Public Works
CP	Contract - Program
DEPC	Directorate of Studies, Programming and Cooperation
DGITR	General Directorate of Road Transport Infrastructures
DGTT	General Directorate of Land Transport
DMER	Material and Road Maintenance Department
EPIC	Public establishment of an industrial and commercial nature
ENER	National Road Maintenance Establishment
ETER	Establishment of Road Maintenance Works
FCFA	Franc of the African Financial Community
FEBAT	Federation of Building and Public Works
FSER	Road Safety and Maintenance Fund
GAR	Results-Based Management
HDM	Highway Development and Management
IDA	International Association for Development
LNTP	National Laboratory of Public Works
MEF	Ministry of Economy and Finance
MET	Ministry of Equipment and Transport
M2P	Mutual company for the promotion of small and medium-sized enterprises
MR/MAU	Mauritania
MRO	Mauritanian Ouguiya
MRU	Mauritanian Unity
ODM	Millennium Development Goals
PAIST	Institutional Support Program for the Transport Sector
PIARC	International Permanent Road Congress Association
PTF	Technical and Financial Partners
RL	Local Roads
RN	National Roads
RR	Regional Roads
SNIM	National Industrial and Mining Company
AADT	Average Annual Daily Traffic
EU	European Union
UEMOA	West African Economic and Monetary Union
VOC	Vehicle Operating Cost

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I. Introduction

1. **This policy note is the result of the Bank's on-going dialogue with the Mauritanian government in the transport sector**. Based on a diagnosis of the sector's constraints, it aims to lay out possible actions to overcome major constraints in road maintenance, and urban mobility in Nouakchott.
2. **The transport sector is managed on behalf of the State by the Ministry of Equipment and Transport (MET)**. The MET is responsible for the formulation and implementation of government policy on civil works and road, rail, air, and river transport. In this capacity, it acts as the contracting authority on behalf of public administrations, local authorities, and public or private institutions under the regulatory conditions in place.
3. **With a road network 11,000 km long (including 5,301 km of national roads, 4,970 km of regional roads, and 729 km of local roads), road transport dominates the sector in Mauritania**. Indeed, 90 percent of passenger transport and 80 percent of freight transport is by road. This places the road sector at the center of transport decisions. This network is composed of 5,935 km of paved roads, 390 km of developed feeder roads and 4,675 km of tracks in natural condition. According to the General Directorate of Road Transport Infrastructures (DGITR), 48 percent of the paved road network is in good condition, 27 percent in average condition (i.e., 75 percent of the network is acceptable and 25 percent in poor condition), which is higher than the African average of 65 percent. However, the local network is fully not well known.
4. **Access to transport infrastructure and services remains spatially unequal**. Rural accessibility[1] and accessibility to markets[2] shows significant spatial differences (Figure 1 and Figure 3), with regions in the west and south showing the highest level of access, while the rest of the country is quite isolated. Much of the rural population still does not have access to an all-weather road, particularly in Eastern areas. These low levels of access and spatial differences showcase the challenges to provide access in low population density areas. Although showing significant constraints to access, the transport sector has seen significant improvements in access from 2010-2020. In this period, rural accessibility improved by 15 pp. In 2020, 21.4 percent of the rural population had access to an all-weather road compared to only 6.4 percent in 2009 (Figure 2). This is comparable to other Sahelian countries. In Mali, the RAI was 22.1 percent in 2017 (World Bank). The Southern and Western part of the country benefited from most of the transport investments in the last decade, as observed in the increase RAI (Figure 2). Although poorer regions in the south saw a larger increase in road length in this period, as many of these areas started off from a lower base, investments may not have been enough in reducing the relative gap with richer and poorer parts of the country (2021 Mauritania Public Expenditure Review, World Bank)[3].

[1] The Rural Accessibility Index (RAI) estimates of the proportion of the rural population within two kilometers of an all-weather road. It is estimated at the commune level (there are 57 communes).

[2] The Accessibility to Markets is measured as the travel time to main consumption centers (cities). Data and analysis from World Bank Maps.

[3] Public Expenditure Review 2021, The World Bank

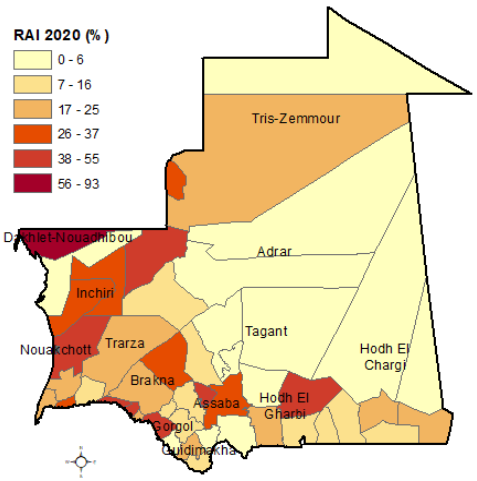


Figure 1. Less than a quarter of the rural population had access to an all-weather road in 2020. Source: Source: Mauritania Public Expenditure Review, 2021

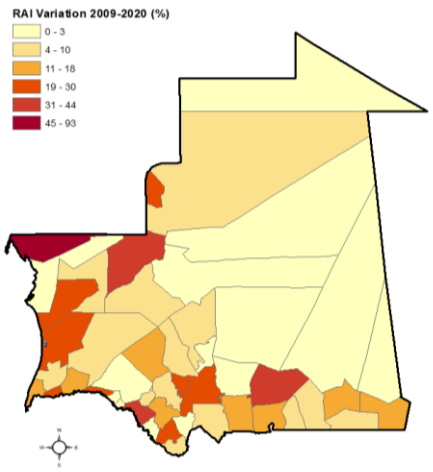


Figure 2. The Rural Access Index tripled between 2009 and 2020. Source: Source: Mauritania Public Expenditure Review, 2021

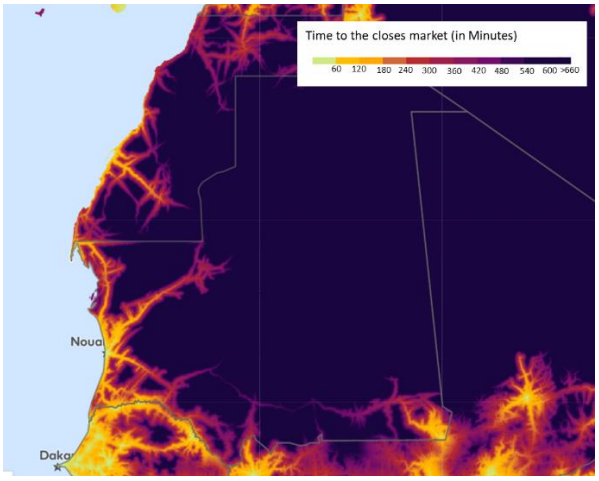


Figure 3. Accessibility to markets (cities). Source : World Bank Maps

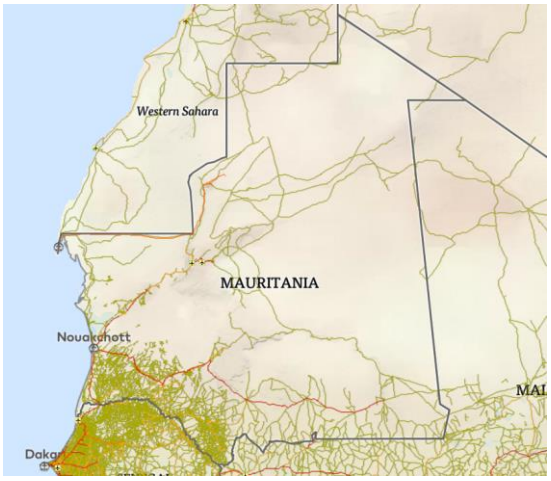


Figure 4. Transport network in Mauritania: roads, ports, airports, and railways. Source : World Bank Maps

5. **The population in Nouakchott is growing faster than in the rest of the country**. Mauritania's population is estimated at 4.5 million, of which about 30 percent lives in the Nouakchott area. Mauritania's annual population growth rate was 2.9 percent between 2000 to 2015, and 4.4 percent in Nouakchott in the same period, which shows a faster population growth in the capital city. It is also expected that Nouakchott will continue growing rapidly due to rural-to-urban migration, mainly caused by resource disparities between rural areas and cities along with the high levels of fertility.
6. **Nouakchott comprises around 35 percent of the country's working population, and this share is expected to increase in the future**. The city's population is young, with an average age of 23 years old. The population under age 25 is about 58 percent of the total city's population and only seven percent of the population is aged 55 or over. This demographic pattern is widely present in

developing countries with high birth rates and decreasing child mortality. However, this structure places significant pressure on educational systems, labor markets, as well as in urban transportation.

7. **The administrative classification of roads in Nouakchott divides roads as arterial, secondary, and tertiary**. Arterial roads include the four national roads that radiate from the city center, while secondary and tertiary roads interconnect the city's neighborhoods with the four main arteries. Non-classified roads are often unpaved and allow the direct access to neighborhoods.
8. **Accessibility to jobs and social services in Nouakchott is not equally distributed between different groups, which is an important element of social exclusion**. Accessibility to opportunities is lower in poorer areas. The differences between rich and poor areas, as summarized in Figure 5, are substantial: where wealthier areas have in average 0.16 opportunities accessible per person via transit, the poorer regions only have 0.03 of such opportunities. Communes such as Riyadh and Toujounine (southeast and east) have limited access to opportunities compared to other communes such as Tevragh Zein and Ksar (center and northwest).

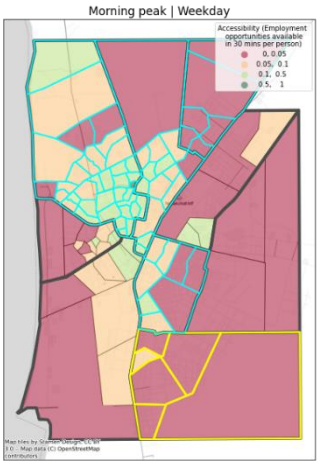


Figure 5. Accessibility distribution for each zone via transit mode of travel[4].

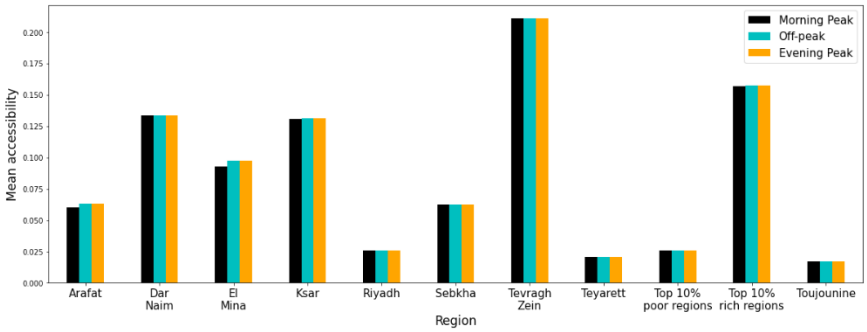


Figure *6. Summary of mean accessibility via transit for principal regions and regions based on poverty scores connected with the morning peak (6-9 AM), off-peak (9AM-4PM and 7-10 PM) and evening peak (4-7 PM) hours.*

9. **Public transport in Nouakchott is provided by both the public and private sectors**. The demand for transportation in Nouakchott increased rapidly in the last decades, and this demand was met by a growing paratransit sector (informal private sector). The predominant informal modes are shared taxis, motorcycles, and three-wheelers.
10. **The labor market has suffered the negative repercussions of the COVI-19 pandemic**, which has resulted in a work stoppage and loss of income, especially among workers in urban areas. Nouakchott is the most affected area with at least 30 percent of households reporting a work stoppage compared to 26.6 percent in rural areas.
11. **The risks of road crashes have increased because of the growth in population, urbanization, and motorization**. It is therefore to be expected that the number of road crashes will continue to increase as the population and the vehicle fleet grow; this can be prevented if the road network improves and effective prevention measures are in place. Inadequate financial resources, but especially the lack of rigorous enforcement of traffic regulations, exacerbate road safety problems. In 2016, the Word Health Organization (WHO) estimated the number of fatalities from

[4] Cyan colored boundaries highlight the wealthiest (top 10 percent) zones while yellow-colored boundaries highlight poorest zones in the Nouakchott region.

road crashes at about 1,000 people, or about almost 25 fatalities per 100,000 people, compared to 22 for Nigeria or less than 3 for the best performing such as those of the Organization for Economic Co-operation and Development[5] . The number of injured people was close to 16,000 during that year.

II. Key issues

a. Key issues on Urban Mobility in Nouakchott

12. **Multiplicity of mandates. There are multiple institutions at central and local levels with responsibilities on urban transport**. The private sector (informal) is another key stakeholder. At a central level, the Ministry of Equipment and Land Transport (MET) has the overall responsibility of defining and implementing Government´s policy in urban transport. Within the MET, the *General Directorate of Land Transport (DGTT)* and the *General Directorate of Road Transport Infrastructures (DGITR)* support in the development of this objective., The *National Consultative Commission of Road Transport (CNCTR)* (which depends of MET) brings together different stakeholders in the transport sector to advice the Ministry on topics related to the road transport. The *Urban Public Transport Company (STP)* operates buses in Nouakchott and at a national level. Finally, the *Authority of Regulation and Organization of Road Transport (AROTR)* plays a role of regulation of transport, for passenger and freight, and urban, interurban, and rural transport. Other Ministries such as the Ministry of Housing, Urbanism and Territorial Development have responsibility in designing planning instruments for urban development. At a local level, the *Urban Community of Nouakchott (CUN)* used to have competences on urban transport, however the recently created Region of Nouakchott took over the competences, although without an explicit transfer of the transport mandates. Private institutions that are also involved in urban transport in Nouakchott include the professional organizations of transporters, drivers, and insurers. Annex 1 describes the legal and organizational framework of urban transport in Nouakchott.
13. **Urban transport competencies are dispersed, often redundant, and not clearly defined as there is a lack of institutional framework to coordinate different institutions and to deal with urban mobility problems in an integrated manner**. The definition of mandates is unclear especially between the *DGTT*, the *AROTR*, and the Region of Nouakchott. Lack of clarity of mandates between different institutions can be found in urban transport planning, organization of public transport, and traffic and parking management. Since the creation of the Region of Nouakchott in 2018, the mandate of the Region in urban mobility is unclear, as the mandates on urban mobility of the former communes have not been explicitly transferred to the Region.
14. **Human resource constraints challenge the efforts to improve the sector**. The institutional capacity of urban mobility institutions is limited by the shortage of trained and specialized staff in urban mobility within government. Capacity constraints are also visible for the informal transport sector, with limited training in business and operating methods. Working towards the professionalization of the informal operators will require capacity building.
15. **Urban sprawl and demographic growth put pressure in service delivery**. In the period between 1990 to 2020, the population on Nouakchott multiplied by 2.7, while its build up area multiplied by 6 and its density was divided by half. As Nouakchott has been growing in population, so has been the case for urban sprawl and at low density, affecting especially the poor that sought for low-cost housing in the periphery. Urban growth, which began in the central area the 1950s/60s,

[5] OECD.

moved toward zones such as Sebkha and El Mina in the 80s, and afterwards to Arafat, Dar Naim, and Riyadh. Growth has followed main transport axes in the city.

16. **Although the government has made an important effort to reduce slums and improve living conditions in poor neighborhoods, the significant demographic growth and low-density development is putting pressure on service delivery and in particular the provision of transport services and infrastructure**. Although low compared with other cities in Sub-Saharan Africa, approximately 7 percent of the population of Nouakchott lives in housing that can be described as precarious (Schéma Directeur d'Aménagement et d'Urbanisme de la Ville de Nouakchott 2018). These housing is mainly located in the eastern periphery of Nouakchott, in the Tarhil area, and in the northwestern part of the city, as shown in Figure 5 and 6.

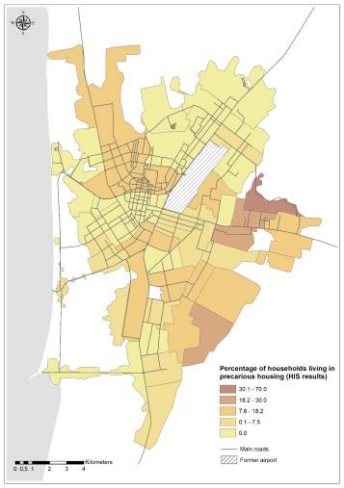


Figure 7. Habitat précaire. Source : Schéma Directeur d'Aménagement et d'Urbanisme de la Ville de Nouakchott 2018

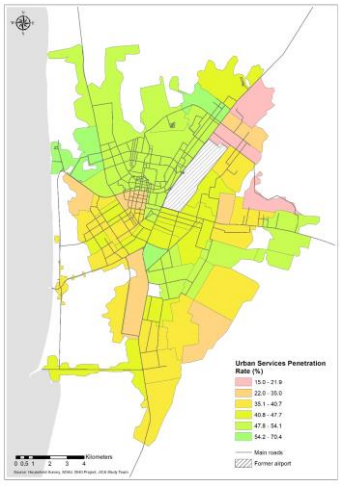
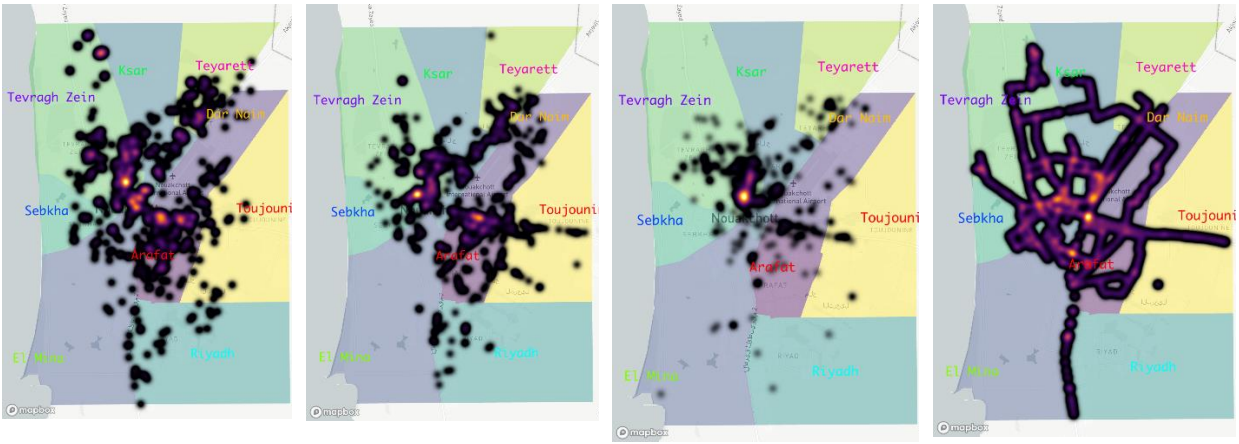


Figure 8. Pénétration des services urbains. Source : Schéma Directeur d'Aménagement et d'Urbanisme de la Ville de Nouakchott 2018

17. **Distant, dispersed, and disconnected neighborhoods**. Agglomeration economies are the benefits that accrue when firms and people locate near one another, thus justifying the existence and importance of cities. However, distance, dispersion, and disconnection between people and opportunities limit Nouakchott's potential to benefit from the concentration of business, labor, and infrastructure. The city is growing on the periphery, where land is cheaper. As peripheral neighborhoods grow, they lack business opportunities and basic services such as schools, hospitals, and markets (see Figure 7). Because they are not well connected with the urban center and other neighborhoods, they become disconnected neighborhoods. This situation leads to high transportation costs and low access to jobs and services.

Figure 9. Heatmap of Services and Jobs in Nouakchott



Educational Facilities | Medical facilities | Employment | Public transport

18. **The paved network is characterized, on the one hand, by inequality in its spatial distribution marked by a relatively high density in the city center and a low density outside the city center, particularly in the suburbs**. The low density of roads is especially noted in the northern and southern regions where future development of the city of Nouakchott is expected. On the other hand, road condition tends to be of worse towards the suburbs, along with several limitations in terms of limited drainage, and coupled with poor funding for maintenance.
19. **Due to the spatial configuration of arterial roads that converge in the CBD, and the limited supply of roads compared to the growing demand, vehicle traffic concentrates mainly in the city center, which generates an unbalance between traffic flow and road capacity**. A congestion analysis was performed using mobile phone data, in which it was observed that the arterial roads suffer high levels of congestion (figure 10 and 11). The probability of various levels of congestion for each selected corridor can be assessed using figure 9.

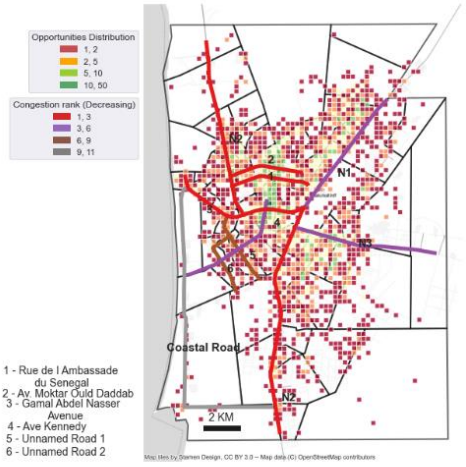


Figure 10. Ranking of corridors based on their congestion levels in decreasing order. Lower levels (red) represent higher congestion in the corridor while higher levels (gray) represent low congestion.

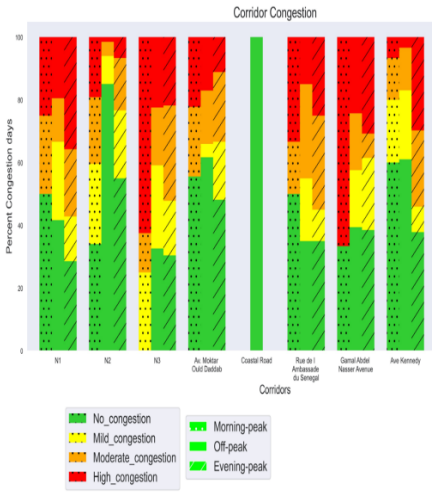


Figure 11. Different levels of congestion observed on various corridors during morning peak, off peak and evening peak hours during weekdays.

20. **Even though most people walk, pedestrian facilities are generally absent**. More than half of the working population in Nouakchott walks to jobs (Figure 10). However, urban road improvements have ignored the needs of pedestrians. Sidewalks are missing in significant part of the network, so that pedestrians and motorized vehicles must share the same space. Where they do exist, sidewalks are poorly maintained, and tend to be overtaken by the expansion of adjoining properties, parking, or trading. Facilities for bicycles and other forms of non-motorized transport (NMT) are non-existent.

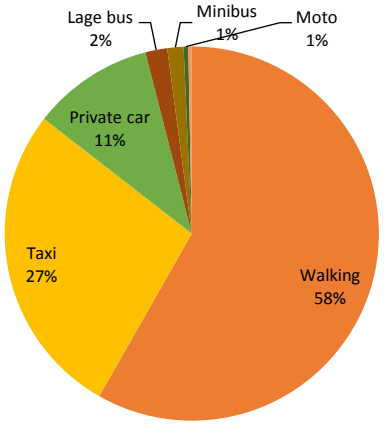


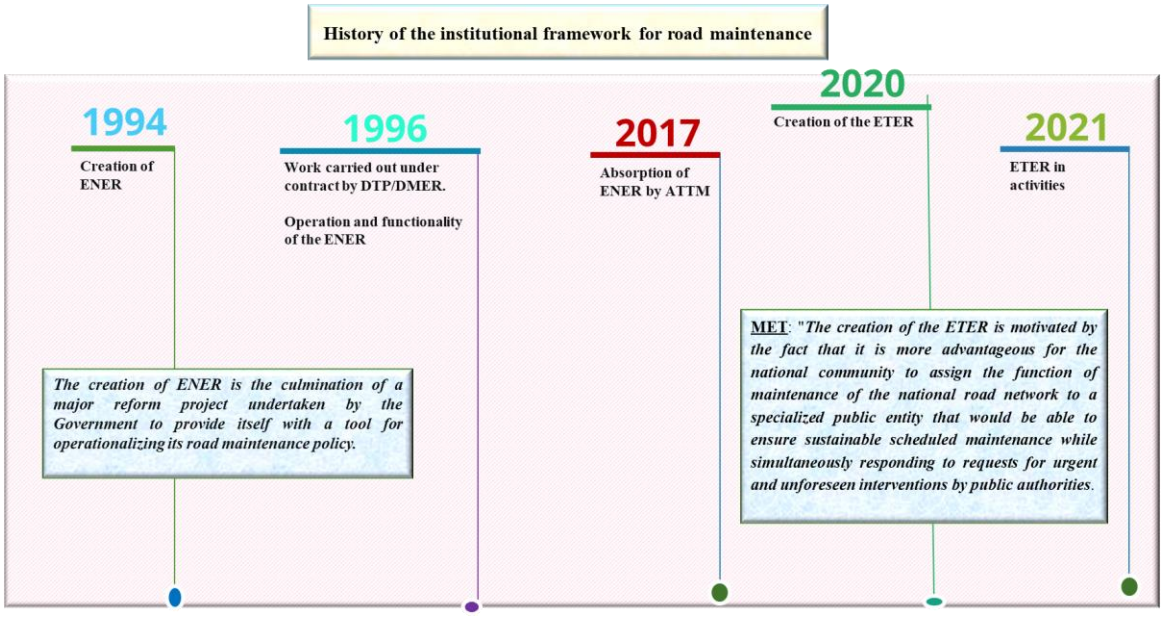
Figure 10. Modal Share Source : Schéma Directeur d'Aménagement et d'Urbanisme de la Ville de Nouakchott 2018

21. **Overall, the quality of the informal transport services is low, however they are filling an important gap for the most vulnerable to reach economic opportunities**. The predominant form of informal transport in Nouakchott is shared taxis, transporting almost 90 percent of the transit trips. Shared taxis usually wait for passengers at specific locations and commence travel once the vehicles are full, which contributes to the unreliability of the services. To ensure high occupancy and rotation, drivers prioritize routes within the city center. Vehicles stopping anywhere on the roadside contribute to the general congestion, especially on the corridors with higher demand where most vehicles are concentrated – and where they compete in the market. The vehicles are generally second-hand imported vehicles.
22. **The "Société de Transport Public" (STP), operates public buses in Nouakchott and at the national level**. As of 2021, STP has an operational fleet of 150 buses (an increase of 60 percent since 2017), 70 percent of which are equipped with IT bus management system (BMS). There has been a significant effort in the last few years to improve the quality and the quantity of bus services of STP, and today buses circulate on the main corridors of the city.
23. **In Mauritania, it is estimated that the cost of fatalities and serious injuries due to road crashes causes a loss of US$390 million which represents 8.2 percent of the country GDP**. Sixty-three percent of road crash fatalities and injuries affect the economically productive groups of 15–64 years (Road Safety Country Profile, GRSF). During the year 2020, 5,857 accidents were recorded in Nouakchott, of which 67 percent were material accidents and 38 percent resulted injury (non-fatal and fatal). Of the total number of victims of traffic accidents in Nouakchott, 3 percent lost their life. The road safety issues are particularly challenging for pedestrian in urban areas. As more than half of the trips in Nouakchott are through walking, the impact of road safety affects daily life of large part of the population, especially low-income groups, women, children, and people with limited mobility.

b. Key issues on road asset management

24. **Road maintenance management suffered from continuous institutional instability**. Historically, road maintenance has always been the responsibility of the MET's technical services; its design, execution and control were carried out by the Directorate of Materials and Road Maintenance (DMER) until 1996. The reorganization of the road maintenance system in Mauritania led to the creation of the National Road Maintenance Institution (ENER) in 1994. Its mission was "to execute as a priority the road maintenance program entrusted to it by the Ministry of Public Works. ENER became operational and functional in 1996. The Council of Ministers of October 19, proposed the integration of ENER into the "Société d'Assainissement, de Travaux, de Transport et de Maintenance" (ATTM-SA) in order to provide the public road maintenance service and to save the recurrent public charges generated by ENER. In 2020, the government created a new entity, the Road Maintenance Establishment (ETER), which is not yet operational (should be operational before the end of 2021).

Figure 11 History of the institutional framework of road maintenance



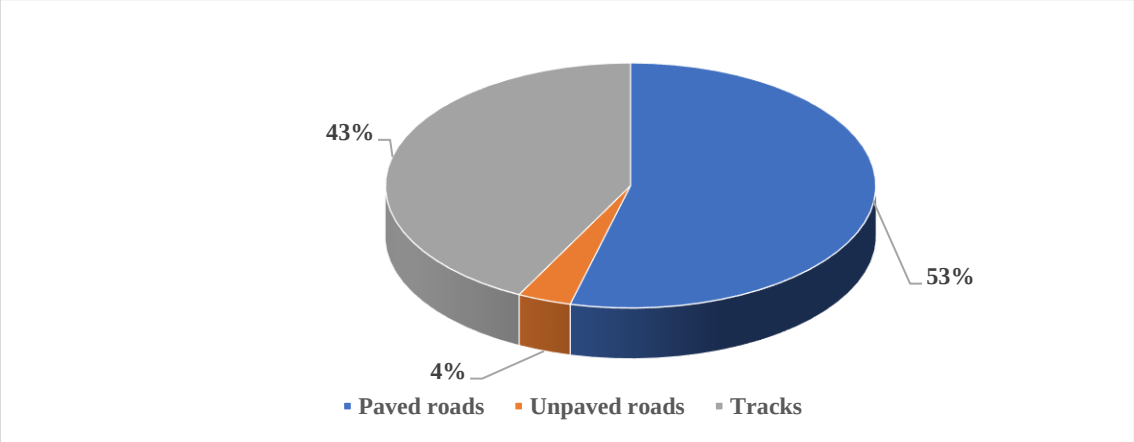
25. **The road network classification has not been updated for decades**. The Road Network is established by the Decree No. 68 - 288 of October 5, 1968, which lays out the function of roads classified as National, Regional and Local but does not define the length of the various types of roads. Moreover, there is no administrative act determining the length of the different roads. This leads to weak reliability of data and information thus preventing a thorough understanding of road network condition. The road network has a total length of about 11,000 km. The network includes 5,301 km (about 48 percent) of National Roads, 4,970 km (about 45 percent) of Regional Roads and 729 km (about 7 percent) of Local Roads. The following graph shows the distribution of the different types of surfaces (table 2 and graph 12).

Table 2: Repartition of the road network

Category of road	Paved roads in km	Earth roads in km	Tracks in km	Total in km
National	4.368	0	933	5.301
Regional	838	390	3.742	4.970
Local	729	0	0	729
Total	***5.935***	***390***	***4.675***	***11.000***

Source: DGITR

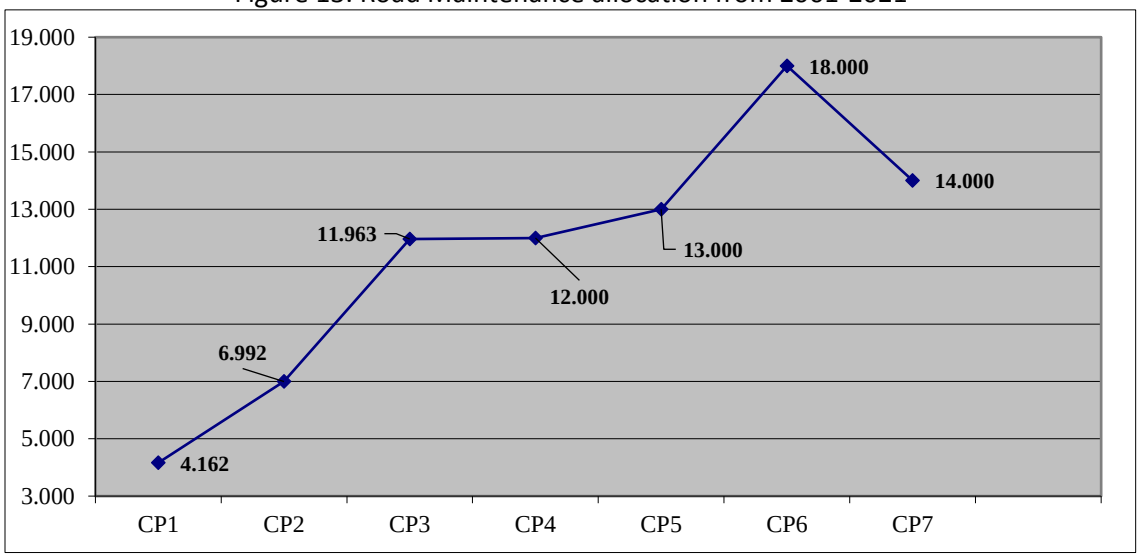
Figure 12: Repartition of the Road Network



26. **Limited data collected of the road network in a regular basis.** The DGITR and ENER/ATTM carry out a visual inspection of the road network each November to identify the maintenance work to be carried out in the following year's program. However, road data are not collected systematically and there is a total lack of processing and updating of these data. As a result, information on the road network is not complete, and the programming of maintenance works is not based on a full assessment of the condition of the roads and their use. This limits the data available to support the prioritization of resources.
27. **Lack of regular road traffic counts**. The last road count for the entire road network was conducted in 2005. According to the traffic studies and feasibility studies, the average annual daily traffic on the interurban roads would be between 200 and 1,800 vehicles depending on the road axes, with an average of about 16 percent of heavy vehicles. Annual growth rates are 7 percent for light vehicles and 5 percent for heavy vehicles. The relative weakness of intercity traffic is explained in particular by: (i) a population density of only about three (3) inhabitants/km2; (ii) a concentration of economic activities and traffic in the major cities (Nouakchott, Nouadhibou, Kiffa, and Rosso) which polarizes the majority of the country's total population.
28. **The method of manual or multi-year programming of road maintenance work is purely indicative**. In addition, the work items are indicated with overall amounts without precise references to the roads concerned. As a result, the amount of resources needed to ensure the required routine and periodic maintenance is not fully identified.
29. **Road maintenance funding sources change over the years**. Even if the decentralization provides that the communes take care of the maintenance of their own network, all financial resources

are destined to the central level. During the period 2001 - 2015, the three-year program contracts between the State and ENER were financed by resources from the "Mineral Export Revenue Stabilization System" (SYSMIN) fund and an allocation from the general budget of Mauritania. For the periods of 2016 - 2018 and 2019 - 2021, the financing of the two Contracts - Programs have been completely assumed by the State on its own resources following the end of the reimbursement of SYSMIN funds. As shown in the Figure 13below, the resources allocated (amounts are expressed in billions of MRO) to road maintenance under the various contracts and programs (CP)are increasing significantly, with an average growth rate of 6.25 percent over the 2001-2021 (each CP cover 3 years).

Figure 13: Road Maintenance allocation from 2001-2021



30. **Despite a significant increase in financial resources allocated for routine and periodic road maintenance since 2002, annual expenditures continue to fall short of the requirements for routine and periodic road maintenance**. This lack of resources jeopardizes the long-term sustainability of government's investments in new road construction. Moreover, with only the resources generated by user fees each year (excluding fuel taxes), the road sector now covers only about 16 percent of its estimated maintenance funding needs.
31. **The average maintenance cost per kilometer of paved road in Mauritania is 45 percent higher than in other West African Economic and Monetary Union countries**. According to the report of the study[6] on road maintenance in the countries of the West African Economic and Monetary Union (WAEMU) conducted in 2015 by the West African Development Bank, the cost of maintaining one kilometer of paved road in the countries of the Union varies from 900,000 CFA francs (corresponding to about US$1,800) for traffic between 500 and 1,000 vehicles per day to 1,250,000 CFA francs (corresponding to about US$2,500) for traffic over 3,000 vehicles per day. The average maintenance cost per kilometer of paved road over the period 2016 - 2018 is MRO 1,266,125 (corresponding to about US$3,620). The maintenance cost per kilometer of asphalt road varied from MRO 1,155,918 (corresponding to about US$ 3,300) to MRO 1,358,614 (corresponding to about US$ 3,800), an increase of about 18 percent between 2016 and 2017. Paradoxically, the maintenance cost per kilometer of paved road varied from MRO 1,358,614

[6] https://www.boad.org/wp-content/uploads/2016/11/150813_agecet_diwi_rapport_prov_er_01.pdf

(corresponding to about US$3,800) to MRO 1,283,843 (corresponding to about US$3,700), a decrease of about 6 percent between 2017 and 2018.

32. **Overall, the maintenance system is characterized by the following weaknesses**: (i) the non-existence of an operational Road Database, regularly updated with traffic and network condition data; (ii) the poor knowledge of the road network and the obsolescence of the legislative and regulatory framework for classification and devolution of road management to the various legal owners; (iii) the lack of a viable mechanism for financing the maintenance of the entire road network, in order to mobilize sufficient and guaranteed resources in time; (iv) deterioration in the quality of studies and works; (v) lack of design, construction, and maintenance standards; (vi) insufficient means (personnel, equipment, financial resources) of the public institutions in charge of the supervision and control of studies and works; (vii) the non-existence of an environment conducive for the sustainable development of roadworks SMEs; and (viii) the absence of a master plan for the development of a varied road network with the levels of development adapted to travel needs and uses.

III. Key actions

The following actions can be considered to address the sector's constraints and enable it to fully play its role as a facilitator of the economy.

a. Key actions on Urban Mobility in Nouakchott

33. **Development of an integrated approach to address mobility and accessibility**. Nouakchott should develop an urban transport system that responds to the needs to access jobs and social services. The urban transport system should support the decarbonization of the transport sector, by promoting active mobility and public transport modes while disincentivizing the development of private vehicles. Proposed actions are structured in seven strategic axes as indicated below.

34. **Axis 1. Strengthening the institutional and legal framework of urban transport**. Institutional and legal frameworks need to be strengthened to serve as the foundation for change in the complex urban mobility area. At an institutional level, it is recommended to enhance institutional coordination by the creation of an *Authority* that can integrate and coordinate urban mobility, the *Nouakchott Transport Authority* (*Autorité Organisatrice de la Mobilité de Nouakchott, AOMN*). The powers of the AOMN could be limited to the organization of public transport of people and goods by all modes but may also include the management of traffic and parking for active modes. A highly integrated AOM would have an institutional integration with urban planning and urban development. The political conditions are not often met to endow an AOM with all these functions, and a gradual approach is often necessary. The integration of powers can therefore be done in stages before finding the organization that best suits the history and institutional culture of Mauritania and Nouakchott. Depending on the type of institutional structure and the scope of intervention and the competences devolved to the AOM, the provisions of the texts below would be subject to modification: (i) Law n°2011-031 of July 5, 2011 on the orientation and organization of road transport; (ii) Organic law n° 2018-010 of February 12, 2018 relating to the Region; (iii) Ordinance n°87.289 of October 20, 1987 establishing the Communes (consolidated); and (iv) Decree No. 2011-221 of September 22, 2011 on the status of the Transport Regulation and Organization of Road Transport.

35. **Axis 2. Enhancing the regulatory framework of public transport**. The regulation of public transport should seek to improve the quality of service to citizens and overall public transport efficiency. It is recommended to support improvements of existing public transport provided by

STP and to support the professionalization of existing informal services (i.e. minibuses and shared taxis) under a sustainable business model. The enhancement of regulatory framework for public transport could start in pilot corridors where government could initiate the regulation of competition for the market (rather than the existing competition in the market or the "penny war"). Government could consider different levels of permits of operations, based on the operational function of the corridors. The public transport regulation should aim at providing higher capacity transport services in higher volume corridors, while a more flexible approach is needed in corridors with less volume. The enhancement of public transport (both formal and informal) will require capacity building of government and private sector.

36. **Axis 3. Enhancing non-motorized transport**. More than half of the trips in Nouakchott are walking trips, however little attention has been paid in the last decades to the needs of pedestrians. It is recommended to develop a quality network of sidewalks, pedestrian-centered traffic management and crossings to enhance local connectivity to communities and integration with other modes.
37. **Axis 4. Improving road density into periphery neighborhoods**. It is recommended to enhance the density of paved roads in the periphery neighborhoods, which has been identified as highly inequal in Nouakchott. Improving of roads in the neighborhoods should also be aligned with planning on enhancement of public transport that access periphery neighborhoods. Road improvements in periphery neighborhoods should come together with road safety and traffic management measures to ensure the safety of different roads users, and especially pedestrians.
38. **Axis 5. Enhancing traffic and parking management**. There is need to develop and implement traffic and parking policy and plans in Nouakchott. Policies should aim at enhancing road safety, efficiency of the vehicle circulation (especially public transport vehicles) and disincentivizing the use of private vehicles (especially applying parking restrictions). In this field, it is recommended to enhance technical skills in traffic and parking management in government, and overall coordination of MET, Region of Nouakchott, and traffic police.
39. **Axis 6. Enhancing capacity in the public and private sector**. It is recommended to launch capacity building programs in urban mobility, monitored and supported by the central level. At a public sector level, it is recommended to enhance specialized skills in urban mobility planning, public transport operations and regulations. Capacity building of private operators would help to operationalize the regulatory framework of public transport. The government should also build capacity within the private bus sector to develop professional operators capable of operating a quality public transport network.
40. **Axis 7. Exploring new sources of finance to respond to major urban mobility requirements**, because investment in the urban sector and existing revenues fall far short of needs. The efficiency of the urban system and of urban service delivery is largely influenced by the provision of adequate financing. Some of the potential sources could come from direct beneficiaries, such as user charges, fuel levies, vehicle operation taxation, and parking fees. Other indirect beneficiaries of urban mobility improvements include land value capture and allocation of different taxes. The development of public–private partnerships (PPP) is another expedient to bridge financing gaps and private-sector added value in urban mobility. The development of regulations guiding PPPs could potentially expand the options available for municipal financing and will require additional technical assistance and regulatory clarification.

b. Key actions on Road Asset Management

41. The proposed strategy includes eight (8) strategic axes as indicated below:
42. **Axis 1**: **Strengthening the legal and regulatory framework**. The diagnostic highlighted the need

to revise the legal and regulatory framework, including Law No. 68-244 of July 30, 1968 and Decree No. 68-288 of October 5, 1968 to ensure their adequacy with the context of the sector and the issues challenging road maintenance. This new classification could be based on the recommendations of the studies carried out in February 2016, within the framework of the Institutional Support Program for the Transport Sector with the support of the European Union.

43. **Axis 2**: **Filling gaps in road planning**. To fill the gaps in road planning, the following can be suggested: (i) Implement a regular traffic counting system at least twice (2) a year; (ii) Make the Road Management Office operational; (iii) Create and regularly update the road database; (iv) Monitor the surface condition of roads; (v) Make road maps to locate all roads; and (vi) Classify the road network.
44. The following could also be recommended: (i) produce a maintenance operation manual whose objective would be to provide guidelines and standards in the organization, management and implementation of maintenance activities, as simple and clear procedures allow for quick and efficient execution. (ii) Implement digital transportation applications by developing GIS applications for geo-mapping of rural networks, measurement and analysis of road roughness index and rural accessibility index, and management of public grievances through a smartphone-based citizen engagement system. And (iii) adopt a resilience strategy based on reducing the risk of catastrophic failure and building resilience to the impacts of climate change and natural disasters. This strategy should include a climate and natural hazard monitoring, early warning, and impact response system.
45. **Axis 3**: **Compliance with axle load regulations**. The objective is to eliminate the degradations caused by non-compliance with axle load regulations by raising national awareness. To this end, it is recommended that an ad hoc committee be set up, which should include all the actors concerned (government, law enforcement agencies, employers, transport unions or federations, etc.). This committee will be responsible for developing a specific action plan to: (i) resolve, in a concerted manner, the problems of overloading, (ii) ensure that the regulations are applied, (iii) identify any accompanying measures that may be necessary, (iv) lead the implementation of a communication plan that broadly involves the transporters, (v) define a management system for the control mechanisms, (vi) define appropriate dissuasive but not excessive sanctions, and (vii) resolve the issue of unloading excess freight.
46. **Axis 4**: **Improving funding mechanisms for road maintenance**. This involves the rapid implementation of the institutional reform, the main elements of which are already being defined, particularly those relating to the organization and operation of the Road Safety and Maintenance Fund (FSER). The draft decree currently being prepared defines the system for mobilizing resources and their retrocession to the FSER and the framework for using these resources. Through these texts, the government should seek to develop a mechanism to increase current resources to meet the maintenance needs of the road network. It could also launch a study for the diversification of financial resources for road maintenance.
47. **Axis 5*:* Monitoring the state of the network**. The objective is to properly perform routine and periodic maintenance on the paved and unpaved road network. For this purpose, the MET should define the minimum quality standards below which interventions must necessarily be triggered on the road in question. Two particularly sensitive, simple, and user-perceivable indicators are proposed: (i) the UNI level and (ii) the pothole area per kilometer of road. Based on the expected levels of service, the roads were classified into two (2) groups: (i) Medium to high level of service roads, they generally correspond to paved roads with high traffic, (ii) and Low level of service roads.
48. **Axis 6**: **Implementation of road maintenance programs**. The government should rebalance the

distribution of funding between the construction of new roads and the rehabilitation of existing ones to correct inadequacies in distribution of resources. This would make it possible to cover maintenance needs and halt the deterioration of the existing road assets. To do this, it would have to develop a routine and periodic maintenance program based on the recommended tools (HDM4/RONET, RED).

49. ***Continue the investment program in the road transport sector***. Despite the investments already made, the density of Mauritania's road network justifies the continuation of an investment program designed to improve the movement of goods and people. This program should ensure the complementarity of the interventions of the various partners in the sector. The program should also strengthen the regional dimension of the country's transport network by improving the North-South and East-West connecting corridors.
50. **Axis 7**: **Performance Measurement Framework**. The expected results of the road asset management strategy are measured by performance indicators that are regularly evaluated and reported on. It is therefore essential to collect baseline data to establish a reference situation for the indicators (sometimes referred to as the "0" condition) and to monitor the evolution of these indicators on a regular basis. A collection of baseline data that allows for the establishment of a reference situation in 2020 characterized by (i) about 25percent of paved roads in poor condition and (ii) 75percent of paved roads in good to average condition. The linear of unpaved roads in poor condition represents about 20 percent of the network.
51. **A performance measurement framework should also include the following**: (i) Coverage of periodic maintenance needs from all sources (percentage), (ii) Coverage of routine maintenance needs from all sources (percentage), (iii) Share of road user charges from fuel levy (percentage), (iv) Regularity of the Resource collection (Daily-Monthly-Quarterly-etc.), (v) Direct channeling of Road user charges,(vi) Technical Audit of the Execution Agencies, (vii) Financial Audit of the Road Fund and Execution Agencies, (viii) Sharing Audit finding and recommendations with all stakeholders.
52. **Axis 8**: **Road Safety and Capacity Building**. The support actions are mainly related to identify key issues and challenges after carrying out a diagnostic based on the Safe System approach including the institutional and country's capacity and resources aspects. This would allow to stablish the main strategic axes for interventions to manage road safety in Mauritania. Activities would include: (i) capacity building for the DGITR, DEPC and ETER: (ii) study of an iRAP in the national road network; (iii) creation of a National Road Safety Agency; (iv) a study of a Road safety pilot in an appropriate road section in Nouakchott in order to observe and identify issues in road safety, (v) development of an awareness and communication plan and monitoring of its implementation, and (vi) Implement an action plan for the implementation of reforms and the awareness and communication plan.