

Analysis of Factors Contributing to Congestion on Roads and Public Land in Old Rufisque (Dakar, Senegal)

Mohamed Lamine Ndao

Higher School of Applied Economics (ESEA), Cheikh Anta Diop University, Dakar, Senegal
Email: mohamedlamine.ndao@ucad.edu.s

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Abstract

This study analyses the main factors causing urban congestion in the historic centre of the municipality of Rufisque East, known as “old Rufisque”. The methodological approach is based on in-depth documentary research, a field phase including direct observations, interviews with resource persons, and the administration of questionnaires to heads of households and users of public space in the targeted neighbourhoods. The results of the data processing show that the occupants of the road and its right-of-way are mainly street vendors (37%), aprons (28%), drivers (24%) and restaurant managers (5%), among other activities. It also helped to identify the major factors causing congestion, such as commercial activities, transport, catering and the storage of building materials, and to examine their effects. Despite the measures taken by the authorities, the phenomenon persists and continues to have a negative impact on the quality of urban life.

Keywords

Clutter, Road Network, Public Domain, Urban Planning, Rufisque East

1. Introduction

Urban congestion has become a recurring phenomenon in most large cities, particularly in developing countries [1] [2]. It is mainly the result of rapid and often poorly controlled urbanisation, which puts severe pressure on infrastructure, degrades the living environment and reduces urban mobility [3]. This situation is exacerbated by an excessive concentration of populations and economic activities in large cities [4]-[6].

In Senegal, activities such as trade, street food vendors, informal transport (il-

legal taxis and Jakarta motorcycles), as well as various workshops and small trades, have developed considerably around roundabouts and roadways. This dynamic creates multiple traffic problems, including congestion on pavements and reduced road width.

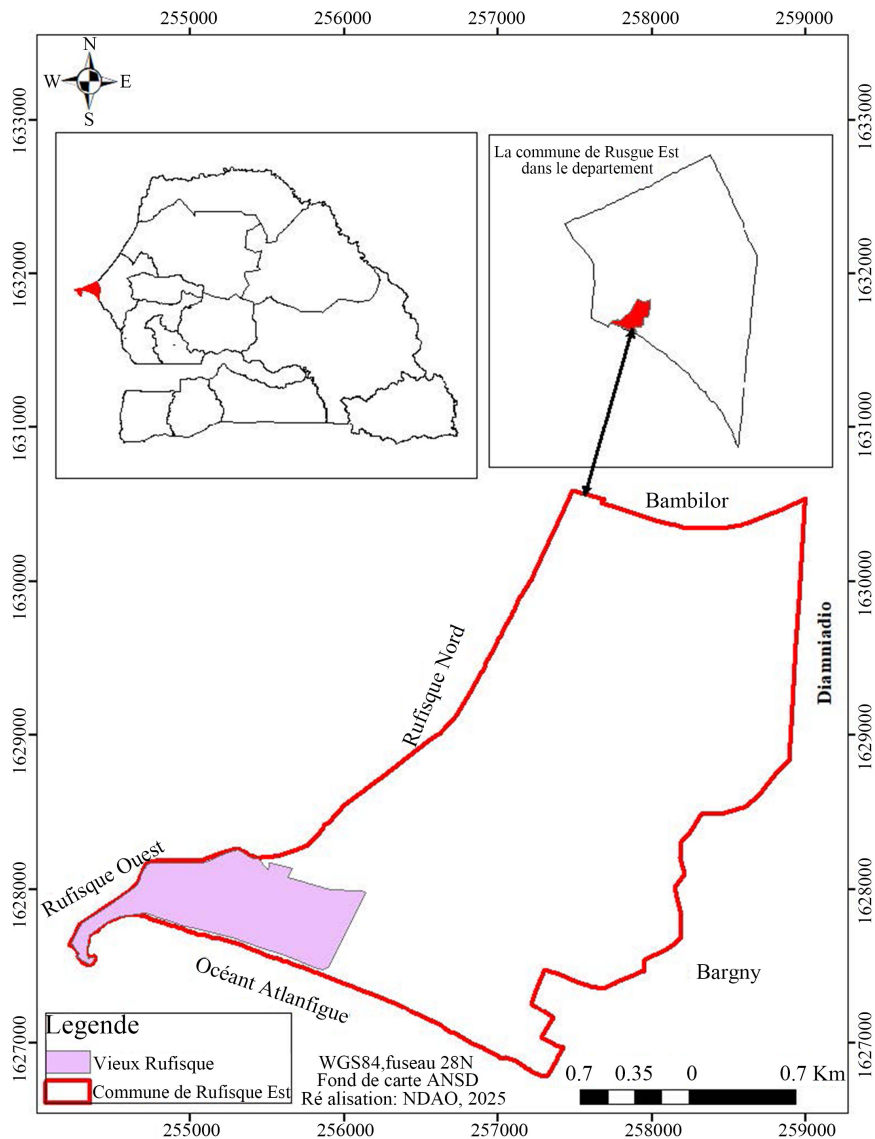


Figure 1. Geographical location of the municipality of Rufisque East.

In Dakar, Petersen station is a striking example of this, with pavements and public roads largely occupied by street vendors [1]. The same phenomenon can be observed in other busy commercial hubs, such as Sandaga Market and the Liberté 6 roundabout [7] [8].

The city of Rufisque is characterised by disorderly occupation of space, which complicates the movement of people and goods while degrading the living environment [9]. Despite regulations, notably Article 2 of Decree 76-08 of 6 January 1976 prohibiting street vending, the illegal occupation of pavements by traders

persists. This phenomenon forces pedestrians to walk on the road, increasing the risk of accidents, traffic congestion, and difficulties in accessing certain areas.

The “Old Rufisque” area, which includes the neighbourhoods of Keury Souf, Keury Souf Gare and Keury Kao, is one of the areas most affected by congestion on the roads and public land. With many social and economic services concentrated around the central market, it is marked by deteriorating roads and disorderly parking. This part of the city is located in the commune of Rufisque East (see **Figure 1**), one of the three communes that make up the city of Rufisque. It includes the city centre and the central market. Under the combined effect of sustained population growth and marked economic dynamism, the commune faces significant challenges related to the management of public spaces and traffic flow.

This research, which aims to analyse the factors causing congestion on roads and public land in the historic centre of Rufisque East, is organised into three main sections: methodology, presentation of results and discussion.

2. Methodology

The methodological approach adopted is based on a mixed approach, combining qualitative and quantitative data collection tools. It consists of three main stages: documentary research, fieldwork, and data analysis.

2.1. Documentary Research

This first stage involved consulting various sources on demographic and spatial dynamics, land use patterns, urban development policies, and the effects of unregulated land use on mobility.

2.2. Field Phase

The collection of empirical data was carried out through semi-structured interviews, questionnaires, and purposive sampling.

2.2.1. Interviews

Maintenance guidelines were developed and administered to various key stakeholders involved in urban management, including: the Directorate-General for Living Environment and Public Hygiene, the Directorate for Congestion Control, the Rufisque-East Sub-Prefecture, the Directorate of Technical Services, representatives of street vendors, neighbourhood delegates and members of grassroots community organisations.

The aim is to understand the motivations and practices associated with the occupation of roads and their right-of-way, to assess the effects of this occupation on traffic, the environment, safety and urban life, and finally to gather the perceptions and proposals of institutional actors with a view to improving the management and regulation of these spaces.

2.2.2. Questionnaire

Two questionnaires were used in this study: the first was sent to heads of house-

holds in the Keury Souf, Keury Kaw and Keury Souf Gare neighbourhoods, identified as the areas most affected by urban congestion; the second was administered to occupants of road right-of-way areas.

The first questionnaire aims to assess the impact of road occupancy and road rights-of-way on neighbouring households, as well as to gather the perceptions and needs of household heads in the neighbourhoods most affected by urban congestion, particularly with regard to the development and regulation of public spaces. The second aims to better understand the practices and dynamics related to the occupation of road rights-of-way by collecting information directly from the actors concerned. More specifically, it identifies the socio-economic profile of the occupants; determines the types of activities carried out on the rights-of-way and their conditions of installation; analyses the motivations behind the occupation of public space; and assesses the effects of these practices on traffic, the environment and urban safety.

A sample was established using the Slovin formula with a margin of error of 5%, bringing the number of households surveyed to 265 out of a total of 789 households [10]. Quota allocation was applied based on the weight of each neighbourhood in the target population. In Keury Souf, the sample selected represents 111 households out of a total of 348; in Keury Souf Gare, 33 households out of 66 were included; and in Keury Kaw, 121 households out of 375 were selected. The sample consists of households residing on the roads most affected by congestion.

As for occupants of public roads and their right-of-ways, 150 individuals were selected at random. The relatively limited number of respondents can be explained by logistical constraints and the reluctance of some individuals to respond, given the sensitive nature of the subject.

2.3. Direct Observation

The aim of direct observation was to collect factual data on the occupation of public roads and rights-of-way in order to better understand the dynamics of congestion in the municipality of Rufisque East. It made it possible to identify the most affected areas, particularly roads, markets, pavements and the surroundings of public facilities. This approach was also used to characterise the different types of occupation observed (stalls, illegal taxi ranks, illegal parking, street vendors, etc.) and to assess their extent. In addition, regular field visits provided an opportunity to compare the data from the documentary analysis with that collected during the fieldwork.

2.4. Data Utilisation and Processing

The multi-variate method was used for the analysis and interpretation of the collected data. Software such as Excel, Word, Arc Gis, and SPSS were used for data processing.

3. Results

To understand the logic behind occupation and the dynamics causing congestion

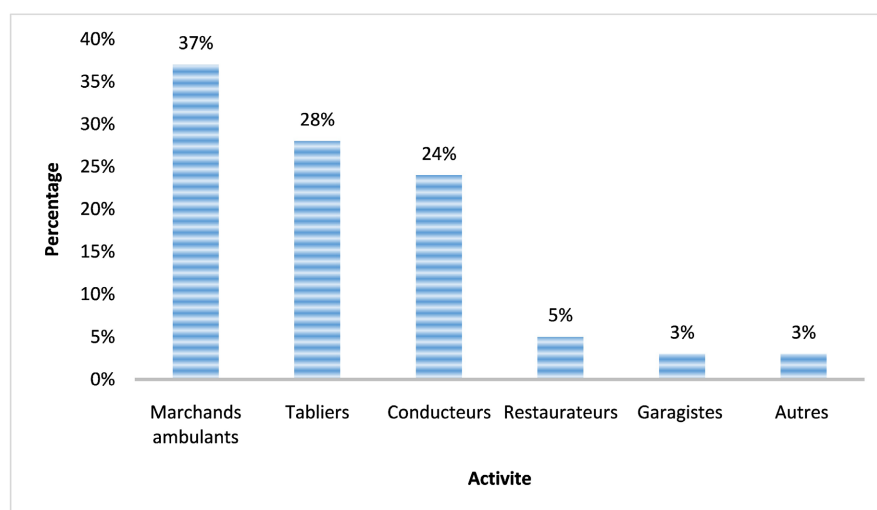
in public spaces in Rufisque East, it is necessary to examine the socio-demographic and economic characteristics of the occupants, the factors explaining the phenomenon, its effects on the urban environment, and the perceptions of local residents.

3.1. Socio-Demographic and Economic Characteristics of Occupants of Public Space in Rufisque East

Analysis of activities carried out on public roads and land is still insufficient to fully understand the phenomenon of congestion. To refine this understanding, it is relevant to examine the socio-economic profiles of occupants.

3.1.1. Distribution of Occupants According to Activity

In Rufisque East, public space is occupied by a wide variety of actors engaged in multiple activities. The survey results clearly illustrate this diversity (**Figure 2**).



Source: Field survey 2024.

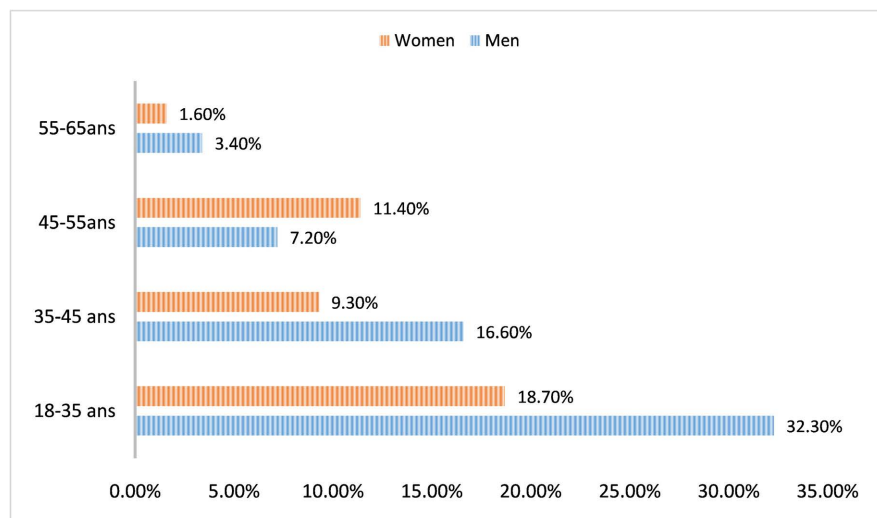
Figure 2. Distribution of occupants according to activity.

The survey shows that street vendors account for the majority of occupants of public roads and public spaces (37%). This group consists of mobile vendors with no fixed location or facilities, often seen near transport stops or in busy areas. Their dominance can be explained in part by their profile. Mostly young, they have not yet acquired the necessary resources to set up a permanent shop. The “tabliers”, sedentary traders set up on pavements or in front of shops, account for 28%. Drivers of (24%), horse-drawn carriages, “tiak-tiaks” or public transport vehicles form another important category. Garage owners (3%) and restaurant owners (5%) are less well represented. The “other” category (3%) includes craftsmen such as carpenters, upholsterers and art dealers who spill out of their workshops to occupy public space.

3.1.2. Distribution of Occupants by Age and Gender

Analysis by age group reveals a high proportion of young people. Young people

account for 51% of those occupying public roads and land. Adults (aged 35 to 55) account for 44%, while older people represent only 5% of the sample. This low presence of elderly people could be explained by the harsh working conditions in public spaces and frequent conflicts with local authorities. Furthermore, young people, who often face high economic burdens, turn to these activities for lack of more stable opportunities. The gender breakdown shows a male dominance in almost all age groups, with the exception of the 45 - 55 age group, where women, particularly vegetable sellers, are more prevalent (cf. **Figure 3**). This trend reflects the social roles assigned to men in Senegalese society, where they bear the majority of the economic responsibilities of the household.



Source: Field survey 2024.

Figure 3. Breakdown of occupants by age and gender.

3.1.3. Relatively High Level of Education among Occupants

The level of education among street vendors and those working in public areas is relatively high. While 9% have only studied the Koran and 5% have no education, 19% have completed primary school, 32% have completed middle school, 23% have completed secondary school and 12% have completed higher education. This profile shows that many graduates, unable to find employment in the formal sector, are turning to the informal sector. This trend challenges the stereotype that street vendors are illiterate.

3.1.4. An Occupation Mainly Carried Out by Actors from Outside the Municipality

Only 21% of those occupying public roads and land reside in the municipality of Rufisque East. The remaining 79% commute daily from their homes to carry out their activities. They mainly come from neighbouring municipalities, notably Rufisque North, Bambilor, Diamniadio, Bargny, Diamaguène and Keur Massar. Furthermore, more than 65% of those surveyed are not originally from the Dakar region.

3.2. A Multitude of Factors Explain the Congestion in Rufisque East

The congestion of public space in Rufisque is the result of a combination of structural and circumstantial causes. To facilitate analysis, these factors have been classified into two main categories: primary factors and secondary factors.

3.2.1. Primary Factors

The primary factors are related to territorial dynamics, urban centrality and planning deficiencies.

1) The central role of “Old Rufisque”

Participant observation revealed that the historic centre of the city, known as “Old Rufisque”, is home to most of the department’s administrative services and economic activities: prefecture, sub-prefecture, municipal services, SENELEC, SONATEL, IDE, water and forestry services, domestic trade, etc. National Road No. 1, the main transit route for lorries coming from the interior of the country, also crosses this area. This strong functional centrality puts intense pressure on road rights-of-way, often to the detriment of their original purpose. As the director of planning for the city of Rufisque points out: *“Most of these spaces have been diverted from their original purpose. This reflects the lack of local social infrastructure. Users are thus forced to reallocate spaces according to their needs”*.

2) Failures in urban planning

More than 86% of household heads surveyed mention the limitations of local governance in terms of planning and regulating local commerce. According to them, the central market and the concentration of facilities in this municipality are the cause of congestion on roads and public land. The central market and its surroundings are jointly managed by two local authorities, the municipality of Rufisque East (CRE) and the city council. However, the CRE continues to refer to a municipal development plan (PDC) covering the period 2017-2021, which did not provide for the zoning of commercial activities.

Conversely, the city council has a Sustainable Urban Development Plan (PDUD) for 2035, including structural projects such as the redevelopment of Boulevard Maurice Gueye. However, the slow implementation of these projects is fuelling urban disorder.

According to the planning director, *“the municipality’s role is to make public spaces inclusive, but the lack of cooperation from retailers and delays in the Promovilles project are paving the way for informal occupation of construction sites”*. The same observation was made by the departmental trade office: *“The central market was not designed for such a dense population, and the canteens are spilling over into residential buildings. There is a lack of specific commercial organisation documentation for the city centre”*.

3.2.2. Secondary Factors

In addition to these structural causes, there are secondary factors linked to socio-economic practices, internal migration, the growth of the informal sector and precarious living conditions.

1) Informal trade as a driver of congestion

In a context of economic insecurity, mass unemployment and limited access to formal opportunities, the informal sector has become a means of survival for many city dwellers in eastern Rufisque. This phenomenon has resulted in the unregulated occupation of roads and public spaces, to the detriment of mobility and urban order. Every day, various types of traders take over pavements, roads, roadsides and transit areas. Sedentary traders (see **Photo 1**), set up on the side of the road or inside the market, sell a variety of products (food, fruit, clothing, technological accessories), contributing to congestion on the main thoroughfares. Alongside them, itinerant traders move around without a fixed location, circulating between vehicles and pedestrians to attract the attention of passers-by, thus exacerbating conflicts over the use of public roads. Others, such as street vendors without a fixed location, wander around on foot, carrying or displaying items purchased from wholesalers (shoes, second-hand clothes, sheets, etc.) on the ground, increasing the density of people on the streets.

In addition, vegetable sellers (**Photo 2**) set up shop early in the morning or at the end of the day, often without authorisation or a designated location. Interviews with the head of municipal technical services revealed that they take advantage of the lack of municipal control to avoid paying rental fees or taxes, displaying their goods directly on the ground or even on the road. This situation is largely the result of a lack of suitable and accessible commercial infrastructure, as highlighted by the director of planning for the city of Rufisque: “*The primary cause is the lack of affordable commercial infrastructure for traders. [...] Secondly, from a spiritual point of view, some believe that the market has baraka, which means that products sell very quickly there*”. Thus, the informal occupation of roads and public spaces by traders and drivers of clandoo taxis and moto Tiak-tiak motorbikes, although expressing an economic necessity, is a major factor in urban congestion according to more than 75% of the heads of households surveyed.



Source: Abdourahmane Faye.

Photo 1. Aprons in a street of the Rufisque market.



Source: Abdourahmane Faye.

Photo 2. Women vegetable vendors displaying their products on the ground.

2) Informal urban transport

Informal urban transport is a key factor contributing to congestion in Rufisque East, particularly due to the diversity of actors involved and their disorganised use of public space. Firstly, there is a high number of “7-seater” vehicles, often parked near the market and the TER station, which frequently obstruct traffic lanes, creating traffic jams and disrupting the flow of traffic. Added to this are illegal garages, or “clandos” (see **Photo 3**), operating informally along the main roads. Although they meet a real demand, particularly from market customers who want to get around quickly, their unregulated parking contributes to congestion on the roads, according to more than 85% of the heads of households surveyed.

Another notable player is the “tiak-tiaks”, motorcycles and scooters inspired by the “Jakarta” used in other parts of the country. These vehicles, prized for their speed, navigate through the market and boulevards, often outside of any regulation, and add to the saturation of urban space. In addition, carts and horse-drawn carriages, used for low-cost transport of people and goods, regularly park on the roadside waiting for customers, hindering the flow of other vehicles.



Source: Abdourahmane Faye.

Photo 3. An informal taxi garage at the entrance of the market.

The same applies to rickshaws, manual carts used to transport food, materials or bulky items. Their slowness and omnipresence in the narrow streets of the city centre exacerbate traffic problems, particularly in the market. Finally, informal mechanical garages, set up on pavements or at the side of the road, further congest the roads and public spaces. These makeshift structures, although necessary, do

not fit well into the urban fabric due to a lack of regulation and, according to all the heads of households surveyed, reinforce the anarchic occupation of public roads.

3) Other factors contributing to congestion

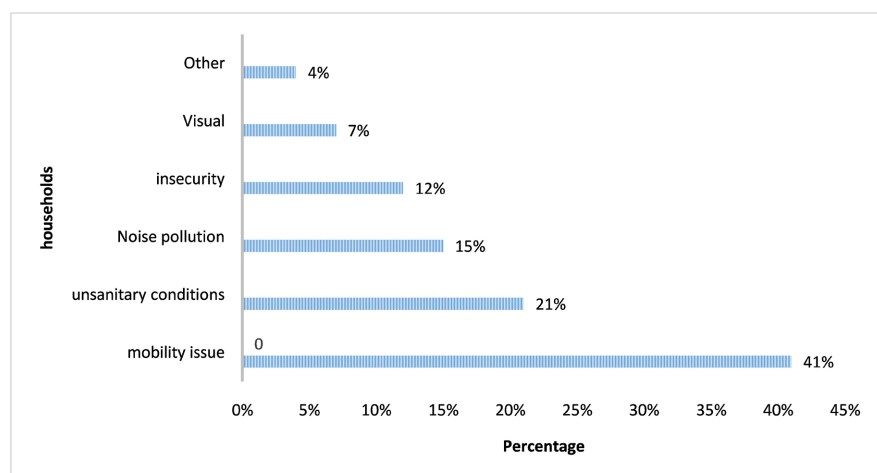
In addition to the two main factors contributing to congestion, other less common types were noted. These include the storage of building materials and the unregulated use of advertising hoardings in the street. According to 25% of the heads of households surveyed.

It is common to see piles of sand, concrete, iron bars or even rubble stored on public roads in front of properties under construction. These materials, consisting of large quantities of sand or concrete, considerably reduce the width of the roads and make it very difficult for people and vehicles to circulate.

Advertising hoardings installed on the street also cause numerous inconveniences for users and the urban environment. They contribute to significant visual pollution by saturating the landscape with commercial messages that detract from the aesthetics of public spaces.

3.3. Effects of Congestion in the Urban Environment

People face significant difficulties on a daily basis as a result of inefficient management of roads and public land, exacerbated by the primacy of individual interests and differing perceptions of public space. This situation leads to the irrational use of public spaces, as illustrated in particular by the town centre of Rufisque East, where congestion manifests itself in many different ways (see **Figure 4**).



Source: Field survey 2024.

Figure 4. Household heads' perceptions of the effects of congestion.

3.3.1. Effects on Mobility and Visual Appearance

1) Difficulties related to travel

According to more than 40% of household heads surveyed, mobility within the municipal area has become particularly difficult. This situation is especially noticeable along the streets bordering Boulevard Maurice Gueye, where the

market, the Orange agency and various other services are concentrated. In fact, vendors spill far beyond the official market area and take over the pavements originally intended for pedestrian traffic. Faced with this irregular and anarchic occupation of traffic areas, walking remains the main mode of transport for more than 77% of heads of households, even though it is often difficult in such conditions.

Some pavements located on the outskirts of markets and along main roads are the most affected. Boulevard Maurice Gueye, in particular, is occupied on both sides by “clandos” and Jakarta motorbikes, which take advantage of the market’s popularity. Car garages (7 spaces) and mechanical workshops also share these spaces, blocking several alleys and sometimes even the front of houses, according to 73.7% of the heads of households surveyed.

2) Visual nuisances

This problem is widely recognised by residents, who often associate it with the disorderly proliferation of advertising hoardings along the roads. However, Rufisque’s main thoroughfare, the boulevard, remains relatively unspoilt thanks to the widening project led by PROMOVILLES. In this context, the municipal authorities regulate the installation of these structures, which nevertheless constitute an important source of revenue for the municipality. Today, it is mainly awnings that are causing the most concern, according to 7% of heads of households. In fact, in most of the streets in the three neighbourhoods studied, particularly in the market extension area, many traders install awnings displaying information about their businesses. Their accumulation ultimately hinders visibility and compromises the legibility of the streets.

3.3.2. Effects on the Living Environment

1) Insecurity

Insecurity has become a particular concern in eastern Rufisque. Illegal structures around the market, illegal taxi garages, etc. have led to obvious insecurity. Twelve per cent (12%) of the heads of households surveyed mentioned this as a major problem in the area. People with reduced mobility are the most vulnerable, as they have to cope with these unregulated activities. In such conditions, getting around often means weaving between vehicles and stalls, using the road at the risk of one’s safety.

2) Unsanitary conditions

The congestion of roads and public spaces in Rufisque causes significant unsanitary conditions, marked by poor management of solid waste and wastewater. Twenty-one percent (21%) of household heads surveyed cited unsanitary conditions as a major concern in the deterioration of their living environment. The proliferation of occupations outside designated areas, illegal settlements and illegal connections to networks disrupt waste collection and drainage. Despite the presence of SONAGED bins, rubbish accumulates near bus stops and street vendors, while wastewater flows directly into the sea, exacerbating environmental problems.

3) Noise pollution

Fifteen percent (15%) of household heads surveyed complain about noise pollution. Indeed, the din of horns, loudspeakers and promotional music is a constant feature. As in most markets in Dakar, music is used as a commercial strategy to attract customers. Added to this are the loudspeakers used by some traders or beggars who take advantage of the daily crowds at the market. This noise, compounded by the incessant honking of horns day and night, subjects local residents to constant noise pollution.

4. Discussion

Analysis of the results obtained shows that congestion on the roads and public land in Rufisque cannot be understood solely by observing visible activities in the city. It is a multidimensional phenomenon, the result of complex interactions between socio-economic dynamics, institutional shortcomings and demographic pressures.

The profile of those occupying public roads and rights-of-way reveals the strong involvement of young people in informal activities. Those under 35 represent 51% of those surveyed. Mostly street vendors and drivers, these young people find a means of subsistence in public spaces due to a lack of formal opportunities. This finding is consistent with the ANSD [10] analyses, which highlight the role of the informal sector as the main provider of urban jobs in Senegal. However, the significant presence of graduates (23% have secondary education and 12% have higher education) in the sector highlights the weak absorption capacity of the formal labour market and the contradictions of an education system that struggles to meet the needs of the local economy. For these young people, opportunities lie mainly in self-employment and business creation within the informal sector, which encompasses a wide range of activities, often carried out individually, such as street trading or crafts [8].

The migration dimension is central. Nearly 65% of the occupants of the municipality's roads and public land come from other regions of Senegal, attracted by the economic opportunities offered by eastern Rufisque and the Dakar metropolitan area. These results are consistent with those of [8]. According to them, with the agricultural crisis and high unemployment rate. Occupants have left their places of origin in the hope of benefiting from the many advantages of urban life in order to improve their living conditions. The occupation of public space thus becomes a response to rural exodus and territorial imbalances. This migratory dynamic accentuates residential precariousness (high proportion of tenants).

The weight of informal trade and transport as drivers of congestion confirms the important role of the informal sector, which is essential to household economies and urban accessibility, but generates disorder, saturation and conflicts over road use. These practices, far from being marginal, reflect a logic of appropriation of public space by users in response to the lack of viable alternatives (accessible formal markets, suitable bus stations, etc.). Markets and bus stations often exceed

their regulatory boundaries and pose real problems for urban governance. They are the starting point for unregulated occupation, with a concentration of commercial activities. Overwhelmed by extremely rapid urban growth, local and central authorities adopt a “laissez-faire model” [11]. The same observation is made by Diop [12], who considers markets to be spaces for recycling rural people who have deserted agricultural land.

The effects of the occupation of public space on the urban environment, congestion, insecurity, unsanitary conditions, noise and visual pollution confirm that clutter is more than just a planning issue. It is a matter of public health, quality of life and urban sustainability. This same situation was explained by Khouma [13], who explained that the anarchic and uncontrolled occupation of public spaces in Dakar causes unsanitary conditions and insecurity. These findings are consistent with observations made in other West African cities such as Lomé [14] and Abidjan [11], where the occupation of public spaces is perceived as a threat to mobility and the living environment.

5. Conclusions

In this study, which aims to analyse the factors contributing to congestion on roads and public land in Old Rufisque, we used a mixed method combining interviews, questionnaires and direct observation. The results show that young people make up the vast majority of those occupying roads and public spaces, with those under 35 accounting for 51% of occupants. The surveys also show that 37% of public road occupants are street vendors. High youth unemployment and rural exodus are the main causes. In fact, more than 79% of public road and right-of-way occupants are not from Rufisque East. Moreover, more than 65% are not from the Dakar region.

Analysis of the factors contributing to congestion on roads and public land in Old Rufisque highlights the complexity of a phenomenon that is socio-economic, spatial and institutional in nature. Surveys reveal that the informal occupation of public spaces is the result of a combination of structural factors, such as the centrality of the old town centre, urban planning failures and weak regulatory instruments, but also of economic factors linked to economic insecurity, unemployment and the rapid growth of the informal sector.

Observations and interviews show that the lack of suitable commercial infrastructure, the lack of parking spaces, the slow implementation of development projects and the lack of coordination between municipal services encourage irregular and persistent occupation of public roads. In environmental and social terms, the consequences are manifold, including deterioration of the living environment, unsanitary conditions, insecurity, noise and visual pollution, and disruption of urban mobility. These combined effects contribute to a loss of functionality in public spaces and a significant decline in the quality of life of residents.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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