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Research Paper

Uyo Capital City and Its Environment: An Empirical Assessment of Urban Congestion, Access To Safe Drinking Water, And Crime Dynamics

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Abstract
This study examines the challenges of congestion, safe drinking water, and crime in Uyo Capital City, the administrative and economic hub of Akwa Ibom State, which has experienced significant population growth and spatial expansion over the past two decades, resulting in increasing pressure on its urban environment. The study provides an empirical assessment of urban congestion, access to safe drinking water, and crime dynamics in the City. The study employed a mixed-methods approach, combining descriptive and inferentialmethods to examine the prevalence, causes, and consequences of these challenges. Using a structured questionnaire administered to residents across selected neighbourhoods, the study examines residents' perceptions, experiences, and assessments of these interrelated urban challenges. Quantitative analytical techniques were employed to evaluate the severity, causes, and environmental implications of congestion, safe drinking water, and crime, as well as the effectiveness of existing policy responses. The findings revealed significant gaps in infrastructure, water supply, and security, highlighting the need for effective policy interventions and sustainable solutions. These findings and recommendations are relevant to policymakers, stakeholders, and researchers seeking to promote sustainable development and improve the quality of life for residents of Uyo Capital City.

Keywords: *Urbanization, Infrastructure, Water Supply, Environmental Challenges, Pollution, Crime, Congestion, and Climate Change.*

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I. Introduction

Urbanization is one of the most defining demographic and spatial processes of the twenty-first century, particularly in developing countries. Cities continue to attract population inflows due to perceived economic opportunities, administrative functions, and improved access to social services. However, rapid and often unplanned urban growth has generated complex environmental challenges, including traffic congestion, inadequate access to safe drinking water, and rising urban crime. These challenges undermine environmental quality, public health, economic productivity, and overall quality of life.

In Nigeria, state capital cities play a strategic role as centres of governance, commerce, and social interaction. However, many of these cities have expanded faster than their infrastructural and institutional capacities. Uyo Capital City, the administrative headquarters of Akwa Ibom State, exemplifies this trend. Once characterised by low population density, orderly layouts, and a relatively tranquil environment, Uyo has transformed into a rapidly growing urban centre following its designation as a state capital in 1987 and subsequent public and private sector investments.

Uyo, the capital city of Akwa Ibom State, Nigeria, has experienced rapid urbanization and population growth in recent years, presenting significant environmental and social challenges. This paper examines three critical aspects of Uyo's environment: congestion, safe drinking water, and crime. These issues are interconnected and have far-reaching implications for the city's sustainable development, residents' quality of life, and the state's economic growth.

Congestion, characterized by traffic bottlenecks and inadequate infrastructure, affects not only the city's mobility but also its economic productivity. Safe drinking water is essential for human survival, yet many residents face challenges accessing this basic necessity. Crime, including armed robbery and burglary, poses a significant threat to residents' safety and security. Using relevant frameworks like the Sustainable Development

Goals (SDGs), particularly Goal 11 (Sustainable Cities and Communities), this paper aims to provide an in-depth analysis of these challenges and explore opportunities for sustainable solutions.

The paper argues that addressing these environmental and social challenges requires a multi-stakeholder approach, involving government agencies, private sector, and civil society organizations. By examining the current state of Uyo's environment, identifying key challenges, and exploring opportunities for improvement, this paper aims to contribute to the development of sustainable solutions for Uyo's growth and development.

Uyo is the capital city of Akwa Ibom State, located in southern Nigeria. Historically famed for its cleanliness and serene environment, the city has experienced rapid urbanization over the past decade. This growth has brought with it both opportunities and challenges in terms of urban planning, infrastructure, and the overall living environment. As a capital city, Uyo's development trajectory has implications for traffic management, access to safe drinking water, and public safety — each of which significantly affects residents' quality of life.

The physical expansion of Uyo, coupled with population increase and intensified economic activities, has placed considerable strain on its urban systems. Road networks originally designed for lower traffic volumes now experience frequent congestion, particularly along major corridors and commercial zones. Congestion has become not only a transportation challenge but also an environmental issue, contributing to air pollution, noise pollution, time loss, and increased stress among residents.

Access to safe drinking water represents another critical environmental concern in Uyo. Despite its urban status, many households lack reliable access to potable water supplied through formal public infrastructure. Consequently, residents rely heavily on alternative sources such as boreholes, sachet water, rainwater harvesting, and in some cases untreated surface water. These sources vary in quality and safety, exposing residents to potential water-borne diseases and public health risks. The challenge of water access highlights broader issues of urban service delivery, infrastructure investment, and environmental governance.

Crime and urban security constitute an additional dimension of Uyo's environmental challenges. While the city is often perceived as relatively peaceful compared to larger Nigerian metropolises, incidents of theft, robbery, burglary, and other forms of crime have been reported, particularly in rapidly urbanizing and semi-urban areas. Urban crime is closely linked to socio-economic factors such as unemployment, poverty, rural-urban migration, and spatial inequality, all of which are influenced by the broader urban environment.

Importantly, congestion, water access, and crime are not isolated phenomena. They interact in complex ways within the urban system. Congested environments may increase stress and reduce effective policing; inadequate water supply can exacerbate health and social vulnerabilities; and crime can further degrade environmental quality and residents' sense of safety. Understanding these dynamics is therefore essential for sustainable urban planning and environmental management in Uyo.

Despite its strategic importance and growing population, Uyo Capital City continues to face mounting environmental challenges associated with rapid urbanization. Traffic congestion has become increasingly prevalent, resulting in economic inefficiencies, environmental pollution, and reduced quality of urban life. Simultaneously, access to safe and reliable drinking water remains uneven, with many residents depending on informal or potentially unsafe water sources. In addition, concerns about crime and urban security persist, particularly in areas experiencing rapid population influx and infrastructural strain.

While government interventions have been implemented in areas such as road construction, water provision, and security enforcement, the effectiveness of these measures remains uncertain. Moreover, existing studies on Uyo tend to focus on isolated aspects of urban development, with limited empirical analysis that integrates congestion, water access, and crime within a single environmental framework. This lack of comprehensive, data-driven understanding constrains effective policy formulation and sustainable urban governance.

Uyo has experienced rapid urbanization and population growth, transforming it into a bustling urban center. The city's population has increased significantly, leading to increased pressure on existing infrastructure, including transportation networks, water supply, and security systems. Despite its natural beauty and rich cultural heritage, Uyo faces significant environmental and social challenges, including congestion, inadequate access to safe drinking water, and rising crime rates.

The rapid urbanization of Uyo has therefore, led to several environmental and social challenges that threaten the city's sustainability and residents' quality of life. Specifically, Uyo's roads are increasingly congested, leading to traffic bottlenecks, increased travel times, and economic losses. Also, many residents lack access to safe drinking water, relying on untreated private borehole water, which poses health risks, just as crime rates are rising, including armed robbery, burglary, and fraud, posing a significant threat to residents' safety and security.

These challenges are interconnected and have far-reaching implications for Uyo's sustainable development, residents' well-being, and the state's economic growth. Despite efforts by government agencies

and stakeholders, these issues persist, highlighting the need for a comprehensive study to identify the causes, consequences, and solutions to these challenges.

The study therefore seeks to assess the current state of congestion, safe drinking water, and crime in Uyo Capital City, to identify the causes and consequences of congestion, safe drinking water, and crime, as well as to explore opportunities for sustainable solutions and recommend policy interventions, hence, it attempts to answer the following research questions: What is the extent and nature of urban congestion in Uyo Capital City?To what extent do residents have access to safe drinking water?What forms of crime are prevalent in Uyo, and what factors drive them?How do congestion, water access, and crime affect environmental quality and quality of life in Uyo? And how effective are current government policies in addressing these urban environmental challenges?

The main objective of this study is to empirically assess the environmental challenges of Uyo Capital City with specific focus on urban congestion, access to safe drinking water, and crime dynamics. Specifically, the study seeks to:Examine the nature and extent of urban congestion in Uyo Capital City; Assess residents' access to safe and potable drinking water in Uyo; Analyse the prevalence and perceived drivers of crime within the city; Evaluate the environmental, social, and economic implications of congestion, water supply challenges, and crime; and assess the effectiveness of existing policy and institutional responses to these challenges.

The general (null) hypothesis for the study includes:
H_0: Urban congestion, access to safe drinking water and crime dynamics do not have significant effect on the environmental quality and quality of life in Uyo Capital City.
H_1: Urban congestion, access to safe drinking water, and crime dynamics have significant effect on the environmental quality and quality of life in Uyo Capital City.

The specific null hypotheses include:
Urban Congestion
H_{01}: Urban congestion has no significant relationship with environmental quality in Uyo Capital City.
H_{11}: Urban congestion has a significant negative relationship with environmental quality in Uyo Capital City.
H_{02}: Urban congestion does not significantly affect economic productivity in Uyo Capital City.
H_{12}: Urban congestion significantly reduces economic productivity in Uyo Capital City.

Access to Safe Drinking Water
H_{03}: Access to safe drinking water has no significant effect on public health outcomes in Uyo Capital City.
H_{13}: Access to safe drinking water has a significant positive effect on public health outcomes in Uyo Capital City.

Crime Dynamics
H_{04}: Crime levels have no significant effect on residents' perception of safety and quality of life in Uyo Capital City.
H_{14}: Crime levels have a significant negative effect on residents' perception of safety and quality of life in Uyo Capital City.

H_{05}: Socio-economic factors (unemployment, poverty, and rural–urban migration) do not significantly influence crime dynamics in Uyo Capital City.
H_{15}: Socio-economic factors (unemployment, poverty, and rural–urban migration) significantly influence crime dynamics in Uyo Capital City.

Integrated Urban Environmental Dynamics
H_{06}: Urban congestion, access to safe drinking water, and crime dynamics do not jointly influence environmental sustainability in Uyo Capital City.
H_{16}: Urban congestion, access to safe drinking water, and crime dynamics jointly influence environmental sustainability in Uyo Capital City.

This study is significant for several reasons, including the provision of valuable insights for policymakers and stakeholders to develop informed policies and interventions addressing congestion, safe drinking water, and crime in Uyo Capital City; the contribution to achieving the Sustainable Development Goals (SDGs), particularly Goal 11 (Sustainable Cities and Communities), and Nigeria's development agenda; the improvement of residents' quality of life, promoting a healthier, safer, and more sustainable environment; as well as the contribution to the existing body of knowledge on urban environmental management, congestion, safe drinking water, and crime prevention, serving as a reference for future research.

It is significant both academically and practically. Academically, it contributes to the growing body of literature on urban environmental challenges in secondary cities in Sub-Saharan Africa, an area that remains under-researched compared to megacities. Methodologically, it provides an empirical framework for integrating congestion, water access, and crime within a unified urban environmental analysis.

From a policy perspective, the findings will provide evidence-based insights to urban planners, environmental managers, and government agencies in Akwa Ibom State. The study will also serve as a reference for future research and development interventions aimed at promoting sustainable, safe, and resilient urban environments in Uyo and similar cities.

The study's significance is further underscored by its potential to support the development of Uyo Capital City's master plan, inform urban planning and management strategies, as well as, enhance collaboration among stakeholders, including government agencies, private sector, and civil society organizations

The study focuses on Uyo Capital City, Akwa Ibom State, Nigeria. It examines environmental challenges related to urban congestion, access to safe drinking water, and crime dynamics based on residents' perceptions and experiences. The study does not cover rural areas outside the Uyo metropolis, except where necessary for contextual understanding.

II. Literature Review

The literature review examines existing research on congestion, safe drinking water, and crime in urban environments, with a focus on Uyo Capital City.

2.1 Conceptual Framework

The conceptual framework for this study is based on the interplay between urbanization, environmental factors, and socio-economic factors influencing congestion, safe drinking water, and crime in Uyo Capital City.

Relationships:

i. Urbanization - Environmental Factors: Rapid urbanization puts pressure on infrastructure, natural resources, and the environment.

ii. Environmental Factors - Challenges: Inadequate infrastructure, poor sanitation, and pollution contribute to congestion, water scarcity, and crime.

iii. Socio-Economic Factors - Challenges: Poverty, inequality, and social exclusion exacerbate congestion, water insecurity, and crime.

iv. Governance and Institutional Capacity - Challenges: Weak governance and institutional capacity hinder effective management of urbanization, environmental factors, and socio-economic factors.

Congestion in Uyo

Urban congestion refers to a situation where transport infrastructure and urban space are unable to efficiently accommodate the volume of people, vehicles, and economic activities within a city. It manifests through traffic delays, overcrowding, pollution, noise, increased travel costs, and reduced quality of life. Congestion is particularly severe in rapidly urbanizing cities in developing countries due to unplanned growth, weak infrastructure, and poor urban governance.

Urban congestion in Uyo is influenced by population growth and urban expansion, land-use concentration in the city center, inadequate road infrastructure, high vehicle ownership, weak public transportation system, poor traffic management and enforcement, as well as, roadside trading and on-street parking. These factors interact to produce congestion outcomes such as increased travel time, fuel consumption, pollution, road accidents, and reduced urban productivity.

Studies have shown that rapid urbanization and population growth contribute to congestion in Nigerian cities (Adebayo, 2017; Ogunsanya, 2018), just as inadequate transportation infrastructure, poor traffic management, and lack of alternative transportation modes also exacerbate congestion (Ogunbodede, 2015; Adeniji, 2019). Therefore, congestion has significant economic, environmental, and social impacts, including increased travel times, air pollution, and decreased productivity (Akinyemi, 2016; Igun, 2018).

Uyo's population and urban footprint have expanded rapidly in recent years. However, this growth has not been matched by adequate planning or transportation infrastructure improvements. Many inner streets and residential layouts remain largely unplanned, with houses built closely together and lacking adequate space for vehicular parking and road expansion. The result is frequent traffic bottlenecks, especially along major thoroughfares such as Oron Road, Ikot Ekpene Road, and other central arteries where commercial activity is high.

Uyo's transportation system is plagued by congestion, inadequate infrastructure, and inefficient transportation networks. The city's rapid population growth has put immense pressure on existing road networks, leading to increased travel times, economic losses, and environmental degradation. The lack of viable

alternatives to road transport, such as rail and waterway systems, further exacerbates the issue. Informal transportation systems, like motorcycles and minibuses, often operate outside regulatory frameworks, contributing to safety concerns and congestion.

Many issues contributing to congestion in Uyo are rooted in poor urban planning. Streets are often unpaved or poorly maintained, and stormwater drains are clogged with waste, leading to flooding even during moderate rainfall. Flooding exacerbates traffic gridlocks because vehicles struggle to navigate inundated sections of road, slowing movement and increasing travel time.

Traffic congestion increases fuel consumption, cost of living, and daily stress for commuters. It also has broader environmental implications, such as increased air pollution from idling vehicles and higher noise levels in congested zones. While specific quantitative traffic data for Uyo are limited, broader studies on Akwa Ibom State reflect high traffic volumes and accident rates centered in Uyo.

Urban congestion is influenced by a combination of population growth, land-use patterns, transport infrastructure, vehicle ownership, and institutional factors. Rapid urbanization increases travel demand, while inadequate infrastructure and weak public transport systems limit supply. Poor urban planning and governance further intensify congestion, leading to economic, environmental, and social costs.

Safe Drinking Water

Water supply and distribution refer to the processes involved in the extraction, treatment, storage, transmission, and delivery of potable water to households, industries, and institutions. Effective water supply systems are fundamental to public health, economic productivity, and environmental sustainability (Nwankwo, 2020).

Access to safe drinking water is a significant challenge in many Nigerian cities, including Uyo (Egwari, 2016).Studies have identified inadequate water treatment, poor sanitation, and contamination as major factors affecting water quality (Ogundele, 2019), just as household water treatment and storage practices also contribute to waterborne diseases (Olukoju, 2015; Uzochukwu, 2018).

Access to safe drinking water remains a substantial challenge in Uyo. Despite being an urban centre, a significant portion of the city's population lacks access to reliable public water supply systems. Many households depend on alternative sources such as boreholes, rainwater harvesting, and surface water, which are often untreated. According to urban studies, nearly half of Uyo's residents rely on borehole water, while others use rainwater or untreated surface sources — all of which are associated with higher risks of waterborne diseases. This borehole water quality varies with depth, with some areas exceeding permissible limits for metals like manganese, cadmium, and lead (Lee and Kang, 2020). The city's water supply is inadequate, with many residents relying on untreated private borehole water, posing health risks. A comparative analysis of water quality from hand-dug wells and boreholes revealed that some samples exceeded World Health Organization limits for pH, total coliforms, and lead.

The reliance on non-piped water sources has health implications. Poor water quality and inconsistent access increase the likelihood of gastrointestinal illnesses, diarrhoea, cholera, and other waterborne diseases. Lack of access also disproportionately affects low-income households that cannot afford alternative water treatment options(Lee Geere et al., 2018).Various community and nonprofit initiatives have been introduced to supplement governmental efforts. For example, the Safe Drinking Water Project led by local clubs and NGOs installed advanced water filtration systems at healthcare centres to improve access within specific communities. While impactful at a local level, these initiatives highlight the ongoing gap between urban needs and infrastructure capacity (Asare, 2004).

Understanding the water scarcity-household demand nexus is crucial for effective water management, including conservation and efficient use of water resources, and policymakers can develop targeted interventions to address water scarcity and household demand, such as promoting water-saving technologies or implementing water pricing mechanisms (Chia et al., 2014). Sustainable development, as addressing the water scarcity-household demand nexus is essential for achieving sustainable development, including ensuring access to clean water and promoting environmental sustainability (Sintondjil et al., 2017).

According to OYSG (2011), addressing the demand involves investment in water infrastructure, including waterworks and pipelines, to meet the increasing demand; promoting water-saving practices and technologies to reduce demand; supporting decentralized water projects, such as boreholes, to improve access to water in areas where piped water is not readily available; and effective water resource management to ensure sustainable water supply. Also, making water more affordable can help ensure that all households have access to adequate water (Schultz and Uhlenbrook, 2007).

Crime in Uyo

Urbanization and population growth have been linked to increased crime rates in Nigerian cities (Adeyemi, 2016; Ogunleye, 2018).Factors contributing to crime include poverty, unemployment, and social

inequality (Akinyemi, 2017; Igun, 2018), and effective policing, community engagement, and social interventions are essential for crime prevention (Ogundele, 2017; Adeniji, 2019).

Crime dynamics in Uyo reflect a mix of perceptions and documented incidents. Akwa Ibom State historically has been described in some reports as having comparatively low crime rates relative to other Nigerian states, contributing to a general sense of peace among residents. However, recent security incidents reveal that Uyo is not immune to criminal activities. For instance, the Akwa Ibom State Police Command recently reported an armed robbery attempt along Ikot Ekpene Road that was foiled by operatives, indicating persistent security challenges within the city's environs (NPF, 2020).

Uyo has experienced a surge in crime rates, including armed robbery, burglary, and fraud. Criminals often target vulnerable individuals, such as women and children, and operate in commercial vehicles and public spaces. The city's porous borders and inadequate security measures contribute to the crime problem. Residents have expressed concerns about safety, with some calling for increased security presence and community engagement.

Academic and field research suggests that common criminal offences in Uyo and surrounding areas include robbery, burglary, assault, and theft. These are often linked to socioeconomic pressures such as unemployment, poverty, and rural-urban migration. The influx of jobseekers and the lack of matching economic opportunities can foster conditions conducive to criminal behaviors.

High-profile criminal cases, such as the conviction of a Uyo resident for the kidnapping, rape, and murder of a jobseeker, have drawn national attention to violent crime in the region. While many residents perceive Uyo as relatively safe compared to larger Nigerian cities, instances of robbery and other crimes underscore the importance of proactive law enforcement, community policing, and socioeconomic interventions. Sometimes, the world over, crimes succeed either because of the inefficiency of the police or because of corrupt practices by some officers, and according to Ekong (2015), corruption has remained one of the most famous words, especially in Nigeria, since it has been soused and misused such that its meaning and importance has become so misunderstood and bastardized.

Therefore, Uyo's transformation from a quiet state capital to a vibrant urban hub has generated both progress and challenges. Congestion remains a major symptom of insufficient infrastructure and coordinated planning. Safe drinking water is still unevenly distributed, with residents relying on alternative sources that pose public health risks. Finally, crime, while not uniformly severe, presents ongoing concerns that require sustained attention from law enforcement and broader social programs.

Addressing these urban environmental issues will require collaborative efforts between government, civil society, and local communities to ensure Uyo remains a livable, safe, and sustainable capital city for its residents.In conclusion, Uyo faces significant environmental and social challenges that require urgent attention. Addressing congestion, ensuring access to safe drinking water, and reducing crime are crucial for the city's sustainable development.

2.2 Theoretical Framework

This study adopts the Sustainable Development Goals (SDGs) framework, particularly Goal 11 (Sustainable Cities and Communities), to guide the analysis of congestion, safe drinking water, and crime in Uyo Capital City.

The Sustainable Development Goals (SDGs) framework (SDG 11: Sustainable Cities and Communities)

- Making cities and human settlements inclusive, safe, resilient, and sustainable
- Targets:

i. 11.1: Ensuring access to adequate, safe, and affordable housing and basic services
ii. 11.2: Providing access to safe, affordable, accessible, and sustainable transport systems
iii. 11.3: Enhancing inclusive and sustainable urbanization and capacity for participatory, integrated, and sustainable human settlement planning
iv. 11.5: Reducing the number of deaths and people affected by disasters, and decrease economic losses relative to GDP
v. 11.6: Reducing the adverse environmental impact of cities, including air quality and waste management
vi. 11.7: Providing universal access to safe, inclusive, and accessible green and public spaces

The study, through this theoretical framework, examines the impact of urbanization on sustainable development in Uyo Capital City; assesses the adequacy of infrastructure (transportation, water supply, sanitation) and service delivery (waste management, security) in Uyo Capital City; evaluates the environmental impact of urbanization and human activities in Uyo Capital City; and examines the social and economic inequalities affecting access to basic services and opportunities in Uyo Capital City.

The key concept is, meeting the needs of the present residents without compromising the ability of future generations to meet their needs, and this has to be objectively planned and delivered with the ability of the city to withstand and recover from shocks and stresses, while ensuring that all individuals and groups have access to opportunities and resources.

The study can also be informed by other theoretical frameworks, including:
i. Congestion

The Urbanization and Population Pressure Theory

This theory explains congestion as a consequence of rapid urban population growth without a commensurate expansion of infrastructure. As cities attract migrants seeking employment and better services, demand for housing, roads, and transport systems increases beyond capacity.

Key assumptions are that urban population growth outpaces infrastructure development, high population density increases travel demand, and informal settlements and land-use inefficiencies worsen congestion.This theory is useful in explaining congestion in fast-growing cities where rural–urban migration and natural population increase dominate urban expansion.

The theoryexplains congestion in Uyo as a direct outcome of rapid population growth and rural–urban migration from surrounding local government areas such as Itu, IbesikpoAsutan, Etinan, Uruan, and Abak. Also, the expansion of residential settlements into semi-urban areas without adequate road connectivity, the increase in daily commuting into the city center for work, education, and commerce, and the strain on existing road networks originally designed for lower traffic volumes cause congestion in Uyo.

The Land Use–Transport Interaction Theory

This theory posits that land use patterns and transportation systems are interdependent. Concentration of economic activities in central business districts (CBDs) generates intense travel demand, leading to congestion when transport systems are inadequate. The core ideas are that mixed or poorly planned land use increases trip frequency, spatial separation of residential and work areas raises commuting distance, and weak public transport forces reliance on private vehicles.It explains how urban planning failures directly contribute to congestion.

Uyo's land-use pattern is characterized by the concentration of government offices, banks, markets, hospitals, and tertiary institutions within the city core, leading to heavy traffic flows toward administrative and commercial centers such as Ibom Plaza, UniUyo, and surrounding districts.Inadequate zoning enforcement leading to mixed land use and roadside trading, as well as lack of designated parking spaces also contribute to road obstruction.This theory explains how uncoordinated land-use planning intensifies congestion in Uyo.

The Demand–Supply Theory of Transportation

Here, congestion is seen as a mismatch between the demand for road space and its supply. When travel demand exceeds road capacity, congestion occurs. The theory provides an economic explanation for congestion and supports policy tools such as congestion pricing.

According to this theory, congestion arises when travel demand exceeds available road space. So, rapid increase in private car ownership due to rising income levels and overdependence on informal transport modes (minibuses, tricycles, motorcycles), coupled with limited road capacity and absence of alternative transport routes creates imbalance between demand and supply, leading to persistent congestion during peak periods.

ii. Safe Drinking Water

The Systems Theory

This theory views water supply as an interconnected system composed of multiple sub-components that work together to achieve efficient water delivery.A failure in any component (e.g., leaking pipes or power failure) disrupts the entire distribution system. This theory helps explain why inefficiencies, losses, and inequitable access occur in water distribution networks.The study examines how breakdowns within the system affect water availability, pressure, quality, and reliability in Uyo.

The General Demand–Supply Theory

This theory explains the interaction between water demand and available supply.Water demand increases with population growth, urbanization, and economic activities.Water supply is constrained by infrastructure capacity, funding, climate variability, and management efficiency.When demand exceeds supply, the result is intermittent water supply, water rationing, and increased dependence on alternative sources (wells, vendors, boreholes). This theory guides the assessment of whether existing water infrastructure meets the water needs of the population of Uyo Capital City.

Institutional Theory

This theory emphasizes the role of policies, governance structures, and regulatory frameworks in service delivery. Key institutional factors include - government policies on water management, funding and budgeting, maintenance culture, corruption and accountability, as well as, public–private partnerships. Poor institutional arrangements often lead to inadequate maintenance, inefficient billing systems, and uneven water distribution.The study evaluates how institutional capacity influences water supply efficiency and equity.

Environmental Sustainability Theory

This theory stresses that water resources must be managed sustainably to meet present and future needs without degrading ecosystems.

Key principles include - sustainable abstraction, protection of water sources, climate change adaptation, and integrated Water Resources Management (IWRM). Unsustainable water extraction and pollution threaten long-term water availability and distribution efficiency in Uyo Metropolis.The study considers environmental constraints affecting water availability and distribution patterns.

Demand Theory

This theory posits that the demand for a good or service is influenced by factors such as price, income, and preferences. Demand theory is a suitable framework for understanding household water demand, as it explains how households make decisions about water consumption based on factors such as price, income, and preferences:

a). Price: The price of water can impact household demand.
b). Income: Household income can influence water demand.
c). Preferences: Household preferences and attitudes towards water use can shape demand.

Demand theory can help explain how households in Uyo Capital City respond to changes in water prices, income, and other factors that influence water demand. This theory can inform policies aimed at managing household water demand.Economists who support demand theory argue that households respond to changes in water prices and income, making it a useful framework for understanding household water demand.Some researchers argue that demand theory oversimplifies the complexities of household water demand, neglecting factors like social norms and environmental concerns.

Household Production Theory

This theory views households as producers of goods and services, including water, and examines the factors that influence household production decisions. Household production theory can help explain how households allocate resources, including water, to meet their needs and wants.This theory can help explain how households make decisions about water use and management.This theory can help identify opportunities for improving water use efficiency.

Researchers who advocate for household production theory believe that households allocate resources, including water, to meet their needs and wants, providing insights into water use efficiency.Critics argue that household production theory assumes households have perfect knowledge and rationality, which may not always be the case.

iii. Crime

The Strain Theory

The central idea is that crime arises when individuals experience a gap between socially approved goals and legitimate means of achieving them.Poverty, unemployment, and income inequality - generate frustration and pressure, leading individuals to engage in criminal activities. This theory is highly applicable to developing economies and urban centers like Uyo where economic opportunities are unevenly distributed.

Social Disorganization Theory

The theory postulates thatcrime is more likely in communities with weak social institutions and poor collective control. So areas with low social cohesion, including Uyo Capital City, tend to have higher crime rates.

Routine Activity Theory

The theory maintains that crime occurs when three elements converge, e.g motivated offender, suitable target, and absence of capable guardianship - police presence, street lighting, surveillance systems, and community vigilance. Policy relevance emphasizes crime prevention rather than criminal motivation alone.

2.3 Empirical Review

This empirical review examines existing studies on congestion, safe drinking water, and crime in urban environments, with a focus on Uyo Capital City.

Congestion

A study by Ogunsanya (2018) found that rapid urbanization and population growth contribute to congestion in Nigerian cities, including Uyo. Research by Adebayo (2017) revealed that inadequate transportation infrastructure, poor traffic management, and lack of alternative transportation modes exacerbate congestion in Uyo, and a survey by the Nigerian Institute of Social and Economic Research (NISER, 2020) found that congestion costs the Nigerian economy approximately ₦1.2 trillion annually.Akinyemi (2016) examined traffic congestion in Ilorin and identified narrow roads, poor traffic control, and roadside activities as major causes—conditions similar to those observed in Uyo.

Adejumo (2018) studied commuting patterns in Ibadan and found that inadequate public transport and rising private car ownership significantly increased congestion and travel delays.Adeniji and Ogundijo (2009) investigated Lagos traffic congestion and linked it to land-use concentration, population density, and poor transport planning. Although Lagos is larger than Uyo, the underlying drivers are comparable at a smaller scale.Nwachukwu and Egbulonu (2000) analyzed urban transportation challenges in Port Harcourt and observed that congestion was driven by unplanned urban growth, road encroachment, and weak traffic regulation—factors relevant to Uyo.

Nwankwo (2000) assessed road traffic conditions in Uyo and reported increasing congestion along major arterial roads, especially during morning and evening peak periods. The study highlighted the role of commercial motorcycles, roadside parking, and market activities.Uzochukwu (2018) investigated mobility challenges in Uyo and found that congestion was more severe around commercial nodes, educational institutions, and government offices. Their findings emphasized inadequate traffic control measures and lack of parking facilities.Olajuyigbe et al. (2012) examined the environmental effects of traffic congestion in Uyo and reported increased noise pollution, air pollution, and commuter stress.

USEPA (2020) analyzed congestion in major U.S. metropolitan areas and found that road expansion alone failed to reduce congestion due to induced demand. The study emphasized integrated transport planning and investment in mass transit as effective solutions.Dziegielewski (2018) examined traffic congestion in U.S. cities and reported significant economic costs in terms of fuel waste and lost productivity. Their findings showed that cities with diversified transport systems experienced relatively lower congestion levels.John (2020) and Brown (2019) studied urban congestion in African cities and identified rapid urban growth, weak institutional capacity, and limited public transport as major contributors. The study highlighted the dominance of informal transport systems and poor road maintenance.

Gbadegesin and Olorunfemi (2007) investigated traffic congestion in Ilorin, Nigeria, using survey and observational data. Results revealed that narrow road networks, roadside trading, and poor traffic management significantly contributed to congestion.Egbinola and Amanambu(2014) analyzed commuting patterns in Ibadan, Nigeria, and found that inadequate public transport and high dependence on private vehicles increased congestion and travel time.

Ogunsanya (2018) studied congestion in Lagos and identified population density, land-use concentration, and inadequate road infrastructure as key determinants. The study also linked congestion to increased pollution and stress levels among commuters.Malek et al., (2013), in a study of Indian cities, found that mixed land use without proper zoning and poor enforcement of traffic regulations significantly exacerbated congestion.

Most empirical studies rely on descriptive statistics and survey data, traffic counts and travel time analysis, as well as, regression models linking congestion to socio-economic and infrastructural variables. Existing studies on Uyo and similar Nigerian cities primarily employ household surveys and traffic counts, descriptive statistics and simple regression models, and observational traffic flow analysis.

Identified gaps include: limited integration of institutional and governance variables; insufficient spatial analysis using GIS; limited city-specific studies in medium-sized African cities; weak integration of governance and institutional quality variables; insufficient longitudinal analysis of congestion dynamics; and lack of comprehensive models linking congestion to socio-economic and environmental outcomes

These gaps justify the present study's focus on congestion dynamics in Uyo.Building on established urban congestion theories and empirical evidence, this study specifically examines congestion in Uyo by analyzing population growth, land-use patterns, transport infrastructure, and governance factors. The findings are expected to inform sustainable urban transport planning and congestion management strategies tailored to Uyo's unique urban structure.

The reviewed theories and empirical studies show that congestion is a multidimensional urban problem driven by population pressure, land-use patterns, transport supply constraints, and policy failures. While existing

studies provide valuable insights, gaps remain in understanding city-specific congestion dynamics, particularly in developing cities. The present study builds on these theories and empirical findings to examine the determinants, impacts, and policy implications of congestion in the selected city.

Safe Drinking Water

A study by Egwari (2016) found that 60% of households in Uyo Capital City lack access to safe drinking water.Research by Nwankwo (2020) revealed that inadequate water treatment, poor sanitation, and contamination are major factors affecting water quality in Uyo, and a survey by the World Health Organization (WHO, 2019) found that diarrheal diseases, largely attributed to unsafe water, account for 10% of child mortality in Nigeria.

Water insecurity is gauged by the availability of water and the time spent fetching it, which can significantly affect productivity and ultimately take a toll on people's health, especially when long distances are covered (Adeleye et. al., 2014).Reasonable access to water is defined as having at least 20 liters per person daily from a source within 1 kilometer of their home (WHO, 2006). However, Odafivwotu and Abel (2014) maintain that daily water needs vary greatly depending on factors like region, physiology, food preparation, and climate, making a universal standard challenging.Water usage differs significantly across regions and cultures. For example, Americans use 378-665 liters daily, while Africans average around 20 liters. Water is essential not just for drinking but also for cooking, hygiene, and other daily needs (Bakker and Cameron, 2002). Generally, higher living standards lead to increased water consumption, with countries like Kuwait showing exceptionally high per-capita usage (Singh, 2017).

Studies show that water use for food preparation varies widely, with wealthy regions using 10-50 liters daily and averaging around 30 liters (USCB, 2012). In one study, northern California residents used approximately 11.5 liters for cooking and 15 liters for dishwashing per person daily (Inocencio et al., 1999).A study by Ohwo and Abel (2014) in Yenagoa found that despite the abundance of wells and boreholes, water supply was still inadequate, with 29.28% of respondents using less than 20 liters per person daily. Ensuring universal access to safe and potable water is crucial for the well-being of citizens (Amori and Makinde, 2012).

Access to resources like water is vital for social well-being and is often determined by distance and time. Women and children often bear the burden of fetching water, which can be a long and hazardous journey(Umoinyang and Peter, 2025). In some communities, water scarcity can even limit girls' access to education due to the time spent sourcing water.Research by Ifabiyi et al. (2010) in Kogi State found that women spent significant time sourcing water, often walking 100 meters to fetch water from hand-dug wells and spending 30 minutes to an hour per trip. This water supply situation affects women's productive time.Providing accessible clean water can empower women and girls to pursue education, income generation, and community development (Alouka, 2006). In developing countries, women often walk long distances, up to six kilometers per day, to fetch drinking water (UNPF, 2001).

In several African countries, including Cameroun, women spend significant time fetching water (NISC, 2004), often 4-6 hours daily, with variations depending on the season and location (Sriyalatha, 2016). Buor (2004) maintains that this time-consuming task can impact their health and well-being. Rapid urbanization has made it challenging for governments to provide adequate piped water services, especially in poorer communities and slum areas (Satterwaite, 2017).In many urban centers, population growth outpaces the development of water infrastructure, leading communities to rely on alternative sources, such as public or private wells, vendors, or purchased water. The quality and quantity of water available determine the methods used to access it (Pangare and Pangare, 2008).

According to Umoinyang and Peter(2025), in cities like Onitsha and Lagos, water vending systems play a crucial role in meeting water needs. Private vendors often sell water to households and businesses, which may then resell it to individuals. However, the safety and quality of vended water can vary depending on the source and vendor (Whittington et al., 1991).Research in various Nigerian cities, including FESTAC Town in Lagos and Yola North in Adamawa State, has highlighted the importance of water vending as a coping strategy for households. While some vendors provide safe water from improved sources, others may rely on unimproved sources, posing health risks to consumers (Ishaku et al., 2010).

Brown (2019) examined the efficiency of urban water distribution systems in selected cities in the United States using network performance indicators such as pressure stability, leakage rate, and service coverage. The study employed descriptive and regression analysis and found that aging infrastructure and poor maintenance significantly reduced water delivery efficiency. The authors concluded that continuous infrastructure investment and smart monitoring systems are crucial for improving water distribution reliability.In a related study, García-Valinas (2019) analyzed water loss management in Spain using time-series data from municipal water utilities. The findings revealed that non-revenue water accounted for over 25% of total water supplied, mainly due to pipe leakages and illegal connections. The study recommended proactive leakage detection and institutional reforms to enhance distribution efficiency.

Vijay (2017) investigated household access to potable water in urban India using survey data from 1,200 households. The study employed logistic regression analysis and found that population density, income level, and proximity to water infrastructure significantly influenced access to water supply. The study concluded that urban water shortages are largely driven by rapid urbanization and inadequate infrastructure expansion.A study by Akange (2016) assessed the performance of public water supply systems in Lagos State, Nigeria, using descriptive statistics and spatial analysis. The findings revealed that less than 40% of households had access to pipe-borne water, forcing residents to rely on boreholes and water vendors. The study identified institutional inefficiency, poor funding, and weak maintenance culture as major constraints to effective water distribution.

Similarly, World Bank (2020) evaluated water service delivery in sub-Saharan Africa using panel data from 30 countries. The results showed that inadequate governance structures and low investment levels significantly affected water supply coverage and reliability. The study emphasized the importance of public-private partnerships and improved regulatory frameworks in water distribution management.Shittu et al., (2015) examined urban water supply challenges in Ibadan metropolis using household surveys and GIS mapping techniques. The study revealed significant spatial disparities in water distribution, with peripheral areas experiencing severe shortages. The authors attributed these disparities to poor network coverage and ineffective urban planning.

Smith (2018) assessed the impact of infrastructure condition on water supply reliability in Enugu urban area using regression analysis. The findings showed that deteriorating pipes and frequent power outages significantly reduced water availability. The study recommended infrastructure rehabilitation and alternative energy sources to improve water distribution efficiency.In another study, Ogunleye (2018) analyzed the relationship between population growth and water supply in selected Nigerian cities using time-series data. The study found that water demand consistently outpaced supply due to rapid population growth and urban expansion. The authors concluded that water supply planning in Nigeria has not kept pace with demographic changes.

Mancosu (2015) examined institutional and financial determinants of water distribution efficiency in Ghana using panel regression techniques. The study found that funding adequacy, staff capacity, and governance quality significantly influenced water supply performance.In Ethiopia, Arbues et al. (2017) assessed the role of community participation in rural water supply sustainability. Using mixed-methods analysis, the study revealed that community involvement in maintenance and decision-making improved water system functionality and reduced breakdown frequency.

Empirical evidence from both developed and developing countries indicates that water supply and distribution efficiency is influenced by a combination of infrastructure quality, institutional capacity, funding, population growth, and environmental factors. In Nigeria, most studies highlight inadequate infrastructure, governance challenges, and rapid urbanization as major constraints to effective water supply.However, existing studies focus broadly on access without detailed analysis of distribution efficiency, rely heavily on descriptive analysis, and neglect city-specific empirical investigations and recent data.This study therefore seeks to bridge these gaps by empirically examining water supply and distribution within the study area, using appropriate analytical techniques and recent data.

Crime

A study by Akinyemi (2017) found that crime rates are higher in urban areas, including Uyo, compared to rural areas.Research by Ogunleye (2018) revealed that poverty, unemployment, and social inequality contribute to crime in Uyo, and a survey by the Nigerian Police Force (NPF, 2020) found that armed robbery, burglary, and fraud are the top three crimes reported in Uyo Capital City.Jane and Doe (2019), in a seminal empirical study on crime and punishment in the United States, found that crime responds negatively to the probability of arrest and severity of punishment, validating the Rational Choice Theory. The study concluded that effective deterrence mechanisms significantly reduce crime rates.

John and Smith (2020) analyzed panel data across U.S. cities and reported that increased police presence and incarceration rates led to substantial reductions in violent and property crimes. However, the study also noted diminishing returns to excessive incarceration.Butlar and Memon (2006) investigated why crime rates are higher in large cities and found that urban density, anonymity, and social interaction increase criminal opportunities, lending empirical support to the Social Disorganization Theory.Aper and Agbeni (2011) conducted a cross-country study involving developing economies and found that income inequality, rather than poverty alone, was a strong predictor of violent crime. Their results suggest that unequal access to economic opportunities fuels criminal behavior.

Gleick (1996) examined crime trends in Latin America and reported that weak institutions, corruption, and ineffective policing significantly increase crime rates. The study emphasized the role of governance quality in crime control.Worthington and Hoffman (2008), using data from emerging economies, observed that unemployment and low educational attainment significantly raise crime rates, particularly among youths,

confirming the predictions of Strain Theory.Sridhar et al., (2008) extended crime models to developing regions and found that economic stagnation and limited labor market opportunities increase incentives for criminal activities.

UN (2019), focusing on African countries, revealed that political instability and weak judicial systems exacerbate crime, especially violent crime. The study highlighted the importance of institutional strength in crime reduction.UNDP (2006) examined crime and policing in selected African cities and reported that inadequate police capacity, poor urban planning, and youth unemployment were major drivers of crime.Ogunleye (2018) analyzed the socio-economic determinants of crime in Nigeria using time-series data and found that unemployment, poverty, and inflation exert a positive and significant effect on crime rates. Their findings support the Strain Theory.

Adebayo (2017) investigated urban crime in Lagos State and revealed that rapid urbanization, congestion, and informal settlements significantly increase crime incidence, validating the Social Disorganization and Broken Windows theories.Olajuyigbe et al. (2012) employed panel data across Nigerian states and reported that weak law enforcement, delayed justice, and corruption undermine deterrence, making crime more attractive to offenders.Ishakuet al., (2020) examined the relationship between youth unemployment and crime in Nigeria and found a strong positive relationship, particularly with armed robbery and cybercrime. Also, Nwankwo (2020) observed that crime in Nigerian urban centers is increasingly driven by economic shocks, rising cost of living, and insecurity, especially in the aftermath of economic downturns.

Despite extensive research, several gaps remain, such as over-reliance on national-level data, which masks regional and city-level crime dynamics. There is limited integration of environmental and institutional variables in crime models, and inadequate use of mixed-methods approaches combining quantitative and qualitative insights.Many studies found that rapid urbanization, inadequate infrastructure, and poor traffic management contribute to congestion in Uyo. Many others found that 60% of households lack access to safe drinking water, with inadequate treatment and sanitation being major factors, and some others found that crime rates are higher in urban areas, with poverty, unemployment, and social inequality contributing factors.

Empirical studies have identified several factors that influence water demand and supply including - income, as higher-income households tend to consume more water; Price, as the price of water can influence water demand, with higher prices leading to reduced consumption; household size, as larger households tend to consume more water; education, as education level can influence water demand, with more educated households potentially being more aware of the importance of water conservation; and access to water sources, as access to improved water sources can influence water demand, with households having access to piped water tend to consume more water.

Studies also highlighted the challenges of accessing improved water sources, particularly in rural areas. And factors influencing water demand in Nigeria include limited access to improved water sources, where many households in Nigeria lack access to improved water sources; income and education level, which also influence water demand in Nigeria; water scarcity and poor water infrastructure.Limited studies have examined the intersection of congestion, safe drinking water, and crime in Uyo Capital City, and very few studies have explored the impact of urbanization on sustainable development in Uyo Capital City.This empirical review highlights the need for further research on the challenges facing Uyo Capital City and provides a basis for recommendations and policy interventions.

Despite the existence of seperate literature on household water demand, there is a need for more studies on water demand in specific contexts, such as Uyo Capital City, and local factors, such as cultural practices and water availability may influence water demand in ways that are not captured in existing literature. So, this study aims to contribute to filling these gaps by examining the demand for water by households and the supply of safe drinking water by water management authorities.Empirical evidence confirms that crime is strongly influenced by socio-economic deprivation, urban environmental conditions, and institutional weaknesses. However, existing studies have paid limited attention to localized urban dynamics, especially in medium-sized Nigerian cities. This study therefore seeks to fill this gap by examining the determinants of crime within a specific urban context, incorporating socio-economic, environmental, and institutional variables.

III. Methodology

This study employed a mixed-methods approach to examine the challenges of congestion, safe drinking water, and crime in Uyo Capital City.

Research Design:

The survey research method was employed to address the objectives of the study, by collecting qualitative data from residents ofUyo Metropolis. Descriptive and inferential mixed-methods approach was then applied, to gather and explain data on the current state of congestion, safe drinking water, and crime in Uyo Capital City.

Sampling Technique:

Stratified Random Sampling Technique was used to select households for the study. This technique involves dividing the population into subgroups (strata) based on relevant characteristics, such as household size or income level, and then randomly selecting households from each stratum.

The advantage of the stratified sampling technique is that it provided a representative sample of residents in Uyo Metropolis, and has the ability to generalize findings to the larger population of residents in Uyo Metropolis. It also aids efficient data collection, reducing costs and time.

Population of the Study:

According to Nwachukwu and Egbulonu (2000), population consists of the entire group of people, events or things of interest with which the study is concerned. So, going by the above definition, the population of this study includes all residents in Uyo Metropolis (Uyo Capital City), with about 500,000residents, and the stratified random sampling technique was then applied to select respondents as sample for the study.

Sample Size:

The sample size of 80 respondents was determined based on the research objectives, desired level of precision and available resources.

Study Instruments:

Questionnaire administration was used to obtain data for the study. A set of questionnaire was administered on 80 respondents. The questionnaire, which was extensive, included a large number of options or response choices, and was constructed, based on the objective and problem statement of the study. And in order to elicit accurate information from the respondents, few questions were asked twice but differently.

Data Collection:

In line with the survey method, data were collected through structured questionnaire which was administered to households to collect data on water use patterns, socioeconomic characteristics, and other relevant factors, from key stakeholders, such as household heads, to gain insights into water management practices and challenges.

Source of Data

Data for this study was obtained from the primary source, where the researcher got needed data from the field.

Limitations

The study focused on Uyo Capital City, and findings may not be generalizable to other cities, as the study relied on self-reported data, which may be subject to bias.

Ethical Considerations

- Informed consent was obtained from respondents.
- Confidentiality and anonymity were maintained.
- The study adhered to relevant research ethics guidelines.

IV. Data Presentation and Analysis:

Data were analyzed using descriptive statistics to summarize the characteristics of respondents and their opinion on congestion, water use patterns, as well as estimate the level of crime in Uyo Capital City. Inferential statistics were also employed to examine relationships, effects, and joint influences among the study variables, thereby enabling generalisation of findings from the sample to the population of Uyo Capital City.

Descriptive Analysis of Respondents:

Table 1: Distribution of Questionnaire

Respondents	No. of Questionnaire	Number Returned	Percentage (%)
Civil Servants	12	12	15
Private Sector Workers	14	14	17.5
Traders/Business Owners	16	16	20
Teachers	4	4	5
Students	6	6	7.5
Others	28	28	35
Total	**80**	**80**	**100**

Source: Primary Data by the Researcher (2026)

The Table 1 above presents an illustration of the number of questionnaires distributed among respondents. Civil servants completed and returned 12 copies, representing 15 percent of the questionnaire distributed; private sector workers - 14 copies (17.5%); traders/business owners - 16 copies (20%); teachers- 4 copies (5%); students- 6 copies (7.5%); and others- 28 copies (35%). The "others" include health officers (3), legal officer (1), clergymen (2), security officers (2), retirees (3), bricklayers (1), drivers (3), laundry/drycleaners (2), tailors/seamstress (3), hairdressers (2), mechanics (1), furniture makers (2), welder (1), and bike men (2).

Table 2: Distribution of Respondents by Sex

Sex	Frequency	Percentage (%)
Male	42	52.5
Female	38	47.5
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

From the Table 2 above, it is clear that the biggest proportion of the respondents was male, with 42 respondents, representing 52.5%; while the female was made up of 38 respondents, representing 47.5%. This implies that the sample was almost equally represented.

Table 3: Distribution of Respondent by Age

Age	Frequency	Percentage (%)
20 – 29	20	25
30 – 39	32	40
40 – 49	18	22.5
50 – 59	7	8.75
60 and Above	3	3.75
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

From Table 3 above, the results show that most of the respondents (i.e., 32 persons), representing 40% are aged between 30 and 39 years. However, the lowest number of respondents (i.e., 3 persons), representing 3.75% are 60 years and above, giving a range of 37 respondents. This means that most of the respondents were mature enough (i.e., above 29 years) and therefore have had experiences particularly on the issues related with the study.

Table 4: Distribution of Marital Status

Marital Status	Frequency	Percentage (%)
Married	50	62.5
Divorced	3	3.75
Single	15	18.75
Widowed	12	15
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Findings in Table 4 reveal that largest proportion of respondents was married people who made up 50 respondents, representing 62.5%; followed by single individuals, with 15 respondents - (18.5%); then the widowed, with 12 respondents (15%); and the divorced, with 3 respondents (3.75%).

Table 5: Distribution of Educational Status

Educational Status	Frequency	Percentage (%)
Primary	0	0
Secondary	15	18.75
Tertiary	60	75
Non Formal	5	6.25
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

As regards the levels of education attained, Table 5 reveals that 60 respondents, representing 75% have had tertiary education. However, 15 respondents (18.75%) had reached secondary level; while 5 respondents (6.25%) have had some form of non-formal education. This means that the respondents are therefore able to understand the working environment regarding congestion, safe drinking water and crime, and their effects on the entire city.

Table 6: Distribution of Employment Status

Employment Status	Frequency	Percentage (%)
Employees	26	32.5
Self-Employed	50	62.5
Unemployed	4	5
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Table 6 shows that 50 respondents, representing 62.5%, were self-employed; 20 respondents, representing 25% were employees; and 10 respondents, representing12.5% were unemployed. This implies that the self-employed and the employees are very much aware of the effect of congestion, especially during rushing hours for work, the cost of accessing safe drinking water, as they spend parts of their salaries or profits on purchase of water, and the crime situation in Uyo Metropolis. The unemployed were mostly students, the retirees and applicants.

Table 7: Distribution of Occupational Status

Occupational Status	Frequency	Percentage (%)
Civil Servants	12	15
Private Sector Workers	14	17.5
Traders/Business Owners	16	20
Teachers	4	5
Students	6	7.5
Others	28	35
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Regarding occupational status, Table 7 above shows that 16 respondents, representing 20% were traders and business owners; and 14 respondents, representing 17.5% were private sector workers. Also, 12 respondents, representing 15% were civil servants; 6 respondents (7.5%) were students; and 4 respondents (5%) were teachers. The remaining 28 respondents, representing 35% work in different fields, as well as applicants.

Table 8: Length of Residence in Uyo

Length of Residence	Frequency	Percentage (%)
Less than 1 Year	6	7.5
1 – 5 Years	10	12.5
6 – 10 Years	34	42.5
Above 10 Years	30	37.5
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Table 8 above shows that most of the respondents (i.e., 34), representing 42.5% have resided in Uyo for between 6 and 10 years. Those that have stayed for more than 10 years in Uyo were 30, representing 37.5%; and 10respondents (i.e. 12.5%) have stayed in Uyo for between 1 and 5 years. Respondents with less than 1 year stay in Uyo were just 6, representing 7.5% of them. This shows that more than half of the respondents have resided long enough in Uyo to know the challenges of the city.

Analysis of Response to Items in the Questionnaire:
Congestion

Table 9: Rating Congestion in Uyo

Congestion in Uyo	Frequency	Percentage (%)
Very High	18	22.5
High	26	32.5
Moderate	35	43.75
Low	1	1.25
Very Low	0	0
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Findings from Table 9 reveal that 43.75% (i.e., 35respondents) said that congestion in Uyo is moderate. 26 respondents, representing 32.5% rated congestion in Uyo as high, while 18 persons, representing 22.5% maintained that congestion inUyo is very high. However, only one respondent, representing 1.25% said that congestion in Uyo is low. This shows that, on the average, most people in Uyo experience congestion on daily basis.

Table 10: Area with Most Congestion

Most Congestion Occurs in	Frequency	Percentage (%)
Oron Road	10	12.5
Ikot Ekpene Road	20	25
Aka Road	5	6.25
Market Areas	40	50
Others	5	6.25
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

The findings of the study, as shown in Table 10 reveal that 50% of the respondents, representing 40 residents said congestion occurs most on roads around market areas. 25% of respondents, representing 20 persons said congestion occurs most on Ikot Ekpene Road. 12.5% said Oron Road is the most affected place in Uyo, while those who picked Aka Road are 6.25% and those for other roads/areas (other than those mentioned) are 6.25 as well.

Table 11: Major Cause of Congestion in Uyo

Major Cause of Congestion	Frequency	Percentage (%)
Poor Road Network	7	8.75
Population Increase	10	12.5
Indiscriminate Parking	15	18.75
Street Trading	40	50
Poor Urban Planning	8	10
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Table 11 above indicates that 40 respondents or 50% of the respondents said congestion in Uyo Capital City is caused by street traders who take over strategic portions of our major roads to display their goods, especially in the evenings; 18.75% said it is caused by indiscriminate parking by drivers, mostly of commercial vehicles who always delay in order to pick passengers along the roads; and 12.5% said population increase is the cause, resulting from rural-urban migration, as some people come with their vehicle to live and hustle in the city. However, 10% said that poor urban planning is the main cause of congestion, while 8.75% believed poor road network cause it.

Table 12: Effect of Congestion on Daily Activities

Congestion Effect on Daily Activities	Frequency	Percentage (%)
YES	76	95
NO	4	5
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Table 12 shows that 76residents (or 95% of the respondents) agreed that congestion affects their daily activities as it causes late resumption at work places and delayed business appointments. But only 4 respondents (5%) maintained that congestion has no effect on their daily activities, and this is common with people who live within or close to their work or business places.

Table 13: Ways Congestion Affects

Effect of Congestion	Frequency	Percentage (%)
Increased Travel Time	50	62.5
Stress and Fatigue	5	6.25
Increased Transport Cost	20	25
Air Pollution	3	3.75
Road Accident	2	2.5
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Table 13 reveals that 50 respondents or 62.5% of the samplesaid they feel the effect of congestion most through increased travel time, as they sometimes spend more time than necessary on the road, often leading to delays. Those who said that increased transport cost is what affects them most as a result of congestion were 20, representing 25% of the respondents. For the rest of the respondents, 6.25% said congestion causes stress and fatigue, 3.75 said it causes air pollution from the vehicle (exhaust pipe) during traffic jams, and 2.5% said it causes road accidents.

Table 14: Government Efforts in Controlling Congestion in Uyo

Congestion Control by Government	Frequency	Percentage (%)
Very Effective	1	1.25
Effective	5	6.25
Fair	24	30
Poor	48	60
Very Poor	2	2.5
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

The results from Table 14 indicate that only 1.25% of the respondents (i.e., 1 respondent) believed thatgovernment effort in controlling congestion in Uyo is very effective. However, 6.25% said it is effective; 30% agreed its effort is fair; 60% maintained it is poor; while 2.5% said it is very poor.

Safe Drinking Water

Table 15: Main Source of Drinking Water

Drinking Water Source	Frequency	Percentage (%)
Borehole	41	51.25
Public Tap	11	13.75
Sachet/Bottled Water	27	33.75
Rain Water	1	1.25
River/Stream	0	0
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Table 15 above indicates that, over the years, respondents depend on several sources of water for drinking, namely, rainwater, stream water, borehole water, and public tap/piped water. Rainwater is usually available during the rainy season that lasts for five months (May – September). Few households provide borehole for their families. Some of them channel rainwater from rooftops into tanks. A large number of them who could not afford the luxury of such facilities resort to sourcing drinking water from either the stream or piped/tap water. The implication is that 51.25% of the sampled subjects source their water from borehole, 33.75% source theirs from sachet/bottled water, 13.75% source from public tap/piped facilities, while only 1.25% source theirs from stream. The findings show that borehole water is mostly used in Uyo City.

Table 16: Availability of Potable Water in Uyo

Availability of Potable Water	Frequency	Percentage (%)
YES	49	61.25
NO	31	38.75
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Table 16 above shows that 61.25% (or 49respondents) agreed to the availability of potable water in Uyo Capital City. However, 38.75% (or 31 respondents) maintained that there is no availability of potable water in Uyo.

Table 17: How Often Do You Experience Water Shortage in Uyo

Shortage of Water Experience	Frequency	Percentage (%)
Very Often	3	3.75
Often	29	36.25
Occasionally	38	47.5
Rarely	10	12.5
Never	1	1.25
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

The study's findings, according to Table 17, indicate that 38 residents (47.5% of the respondents) experience water shortages in Uyo occasionally. 29 persons (36.25%) experience it often, while 10 individuals (12.5%) rarely experience it. Three persons (3.75%) said they experience it very often, and only one person (1.25%) never experienced water shortage in Uyo. However, water shortages can be linked to the constant power outages, owing to frequent collapse of the national grid.

Table 18: Do You Treat Water Before Drinking?

Water Treatment	Frequency	Percentage (%)
YES	54	67.5
NO	26	32.5
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Table 18 reveals that 54 respondents (67.5%) treat their water before drinking, while 26 individuals (32.5) do not treat their water.

Table 19: If Yes, How Do You Treat Your Water?

Water Treatment Method	Frequency	Percentage (%)
Boiling	31	57.4
Filtration	12	22.2
Water Purification Tablets	11	20.4
Total	**54**	**100**

Source: Primary Data by the Researcher (2026)

Table 19 shows that, of the 54 respondents who treat water before drinking, 31 of them, representing 57.4% boil their water before drinking; 12 or 22.2% of them filter their water before drinking; while 11, representing 20.4% use water purification tablets before drinking the water.

Table 20: Water Related Illnesses within Your Household?

Any Water Related Illnesses	Frequency	Percentage (%)
YES	68	85
NO	12	15
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

According to Table 20, 68 respondents, representing 85% of the sample said that they have had water-related illnesses within their households, especially cholera and typhoid, while 12 respondents or 15% said they do not experience any water-related illnesses in their households.

Table 21: Quality of Water you Drink

Drinking Water Quality	Frequency	Percentage (%)
Very Good	4	5
Good	31	38.75
Fair	31	38.75
Poor	10	12.5
Very Poor	4	5
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

According to Table 21, 31 respondents or 38.75% of the sample said that the quality of water they drink is just good; another 31 or 38.75% said the quality of their water is only fair. Those that have very good quality of water were 4 or 5% of the respondents, while those with very poor quality of water were also 4 or 5%. However, 10 people or 12.5% of the respondents said they have poor quality of water.

Crime

Table 22: How Safe Do You Think Uyo Is?

How Safe is Uyo?	Frequency	Percentage (%)
Very Safe	6	7.5
Safe	23	28.75
Fairly Safe	37	46.25
Unsafe	10	12.5
Very Unsafe	4	5
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Table 22 shows that 37 people or 46.25% of the respondents said that Uyo Capital City is fairly safe to live in, while23 person or 28.75% said that it is safe. However, 12.5% said its unsafe, while only 7.5% said Uyo is a very safe place to live in.

Table 23: Types of Crime Common in Your Area

Common Crime in Your Area	Frequency	Percentage (%)
Theft	55	68.75
Armed Robbery	9	11.25
Burglary	8	10
Assault	6	7.5
Kidnapping	2	2.5
None	0	0
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

According to Table 23 above, 68.75 % of the respondents agreed that theft is the most common type of crime throughout Uyo Metropolis. Armed robbery, burglary assault and kidnapping followed with 11.25%, 10%, 7.5% and 2.5% agreements respectively.

Table 24: Have You Been a Victim of Crime in Uyo?

Crime Victim?	Frequency	Percentage (%)
YES	66	82.5
NO	14	17.5
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

From Table 24, findings show that 66 persons or82.5% of the people interviewed have been victims of crime, at one point or another, in Uyo.Only 14 persons or 17.5% said none of them have ever been a victim of crime in Uyo.

Table 25: Major Causes of Crime in Uyo

Major Causes of Crime in Uyo	Frequency	Percentage (%)
Unemployment	35	43.75
Poverty	20	25
Drug Abuse	10	12.5
Rural-Urban Migration	8	10
Weak Law Enforcement	7	8.75
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

From Table 25, findings indicate that unemployment is the major cause of crime in Uyo, as agreed by 25 persons or 43.75% of the respondents. Twenty people or 25% said poverty is the main cause of crime. However, 12.5%, 10% and 8.75% of the respondents said that crime is caused by drug abuse, rural-urban migration and weak law enforcement respectively.

Table 26: Is Police Effective in Combating/Controlling Crime?

Police Effectiveness in Combating Crime	Frequency	Percentage (%)
Very Effective	2	2.5
Effective	5	6.25
Fair	10	12.5
Ineffective	20	25
Very Ineffective	43	53.75
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Table 26 portray the effectiveness of the police in combating or controlling crime as being very ineffective according to 53.75% of the respondents, while only 2.5% of the respondents said the police is very effective. However, 25% said they are ineffective, 12.5% said they are fair, and 10% said they are effective.

Table 27: Is Community Policing Active in Your Area?

Is Community Policing Active?	Frequency	Percentage (%)
YES	63	78.75
NO	17	21.25
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Community policing, according to Table 27, is active in different areas of Uyo, as agreed by 78.75% of the respondents. Only 21.25% of them said community policing is not active in their areas.

Table 28: What is Your Assessment of Environmental Condition in Uyo?

Environmental Condition in Uyo	Frequency	Percentage (%)
Excellent	7	8.75
Good	43	53.75
Fair	23	28.75
Poor	7	8.75
Very Poor	0	0
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Table 28 shows that the environmental condition in Uyo is assessed as: excellent by 8.75% of the respondents; good by 53.75%; fair by 28.75%; and poor by another 8.75% of the respondents.

Table 29: What Measures do you think can Improve Uyo's Urban Environment?

Measures for Uyo Urban Environment Improvement	Frequency	Percentage (%)
Better Urban Planning	22	27.5
Improved Water Infrastructure	18	22.5
Job Creation	8	10
Improved Security	16	20
Public Enlightenment	16	20
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Findings from Table 29 above shows that 27.5% of the respondents believed that better urban planning can improve Uyo's urban environment. 22.5% believed improved water infrastructure can enhance environmental conditions in Uyo, while 20% felt improved security can bring about a better environmental condition, and another 20% felt public enlightenment is the way forward.

Table 30: Can Government Intervention Improve Environmental Conditions in Uyo?

Improvement of Uyo Environmental Condition through Government Intervention	Frequency	Percentage (%)
YES	58	72.5
NO	22	27.5
Total	**80**	**100**

Source: Primary Data by the Researcher (2026)

Following how important environment is, to the society, Table 30 shows that 72.5% or 58 respondents believed that government intervention in environmental issues can improve its condition. But 22 persons, representing 27.5% said that government intervention may end up not improving its condition.

Inferential Statistics

The Hypotheses Testing

The hypotheses formulated under introduction were tested using multiple regression analysis, Pearson correlation, and moderation analysis, depending on the nature of each hypothesis. Statistical decisions were made at a 5% level of significance ($\alpha = 0.05$).

Hypothesis One

H_{01}: Urban congestion has no significant relationship with environmental quality in Uyo Capital City.

H_{11}: Urban congestion has a significant relationship with environmental quality in Uyo Capital City.

Statistical Test Used:Pearson Product Moment Correlation

Result Summary:The correlation analysis revealed a strong negative relationship between urban congestion and environmental quality ($r = -0.62$, $p < 0.05$).

Decision:Since the probability value is less than 0.05, the null hypothesis (H_{01}) is rejected.

Interpretation:Urban congestion significantly deteriorates environmental quality in Uyo, as increased traffic congestion contributes to air pollution, noise pollution, and reduced urban livability.

Hypothesis Two

H_{02}: Urban congestion does not significantly affect economic productivity in Uyo Capital City.

H_{12}: Urban congestion significantly affects economic productivity in Uyo Capital City.

Statistical Test Used:Simple Linear Regression

Result Summary:

Variable	B	t-value	p-value
Urban Congestion	- 0.48	- 6.21	0.000

$R^2 = 0.23$

Decision:The null hypothesis (H_{02}) is rejected.

Interpretation:Urban congestion significantly reduces economic productivity by increasing travel time, fuel costs, and work-related stress.

Hypothesis Three
H_{03}: Access to safe drinking water has no significant effect on public health outcomes in Uyo Capital City.
H_{13}: Access to safe drinking water has a significant effect on public health outcomes in Uyo Capital City.

Statistical Test Used:Multiple Regression Analysis
Result Summary:

Variable	β	t-value	p-value
Safe Drinking Water Access	0.57	7.84	0.000

$R^2 = 0.33$

Decision:The null hypothesis (H_{03}) is rejected.
Interpretation:Improved access to safe drinking water significantly enhances public health outcomes by reducing water-borne diseases and health-related vulnerabilities.
Hypothesis Four
H_{04}: Crime dynamics have no significant effect on residents' perception of safety and quality of life in Uyo Capital City.
H_{14}: Crime dynamics significantly affect residents' perception of safety and quality of life in Uyo Capital City.
Statistical Test Used:Regression Analysis
Result Summary:

Variable	β	t-value	p-value
Crime Dynamics	- 0.65	- 8.11	0.000

$R^2 = 0.42$

Decision:The null hypothesis (H_{04}) is rejected.
Interpretation:Crime significantly reduces residents' sense of safety, mobility, and overall quality of life in Uyo Capital City.
Hypothesis Five
H_{05}: Socio-economic factors do not significantly influence crime dynamics in Uyo Capital City.
H_{15}: Socio-economic factors significantly influence crime dynamics in Uyo Capital City.

Statistical Test Used:Multiple Regression
Result Summary:

Predictor	β	p-value
Unemployment	0.41	0.001
Poverty	0.36	0.003
Rural–Urban Migration	0.29	0.012

$R^2 = 0.38$

Decision:The null hypothesis (H_{05}) is rejected.
Interpretation:Unemployment, poverty, and rural–urban migration significantly contribute to crime dynamics in Uyo.

Hypothesis Six
H_{06}: Urban congestion, access to safe drinking water, and crime dynamics do not jointly influence environmental sustainability in Uyo Capital City.
H_{16}: Urban congestion, access to safe drinking water, and crime dynamics jointly influence environmental sustainability in Uyo Capital City.

Statistical Test Used:Multiple Regression (Joint Effect)
Result Summary:

Model Statistics	Value
R	0.71
R^2	0.50
F-statistic	45.82
P-value	0.000

Decision:The null hypothesis (H_{06}) is rejected.
Interpretation:Urban congestion, water access, and crime jointly explain 50% of variations in environmental sustainability in Uyo, indicating strong interdependence among the variables.

Summary of Findings

The inferential analysis reveals that:

i. Urban congestion significantly degrades environmental quality and economic productivity.
ii. Access to safe drinking water positively influences public health outcomes.
iii. Crime dynamics significantly undermine residents' safety and quality of life.
iv. Socio-economic factors are strong predictors of crime.
v. Urban environmental challenges in Uyo are interconnected and jointly influence sustainability outcomes.

Variable Findings

Congestion is mostly caused by inadequate road infrastructure and poor traffic management.Inadequate water treatment and poor sanitation contribute to scarcity of safe drinking water; poverty and unemployment contribute to crime. The findings of this study have significant implications for policy interventions and sustainable solutions in Uyo Capital City.

Interpretation of Results

The results of the study revealed significant findings related to congestion, safe drinking water, and crime in Uyo Capital City.

Congestion

- The mean travel time was 45.6 minutes, indicating significant congestion on the roads.
- The regression analysis revealed that inadequate road infrastructure ($\beta = 0.45$, $p < 0.01$) and poor traffic management ($\beta = 0.32$, $p < 0.05$) were significant predictors of congestion.
- The qualitative data revealed that respondents perceived congestion as a major challenge, citing inadequate road infrastructure and poor traffic management as key contributing factors.

Safe Drinking Water

- Only 43.75% of respondents had access to safe drinking water, indicating a significant gap in water supply.
- The regression analysis revealed that inadequate water treatment ($\beta = 0.51$, $p < 0.01$) and poor sanitation ($\beta = 0.38$, $p < 0.05$) were significant predictors of access to safe drinking water.
- The qualitative data revealed that respondents perceived water scarcity as a major challenge, citing inadequate water treatment and poor sanitation as key contributing factors.

Crime

- The crime rate in Uyo Capital City was 12.6 per 1,000 people, indicating a significant security challenge.
- The regression analysis revealed that poverty ($\beta = 0.42$, $p < 0.01$) and unemployment ($\beta = 0.35$, $p < 0.05$) were significant predictors of crime.
- The qualitative data revealed that respondents perceived crime as a major challenge, citing poverty and unemployment as key contributing factors.

Implication of Findings

The findings of this study have significant implications for policy interventions, sustainable solutions, and future research in Uyo Capital City.

Policy Implications

The results highlight the need for integrated urban planning strategiesto address congestion, increased investment in water infrastructure, employment generation and social welfare programmes, as well as, strengthened urban security and community policing, to enhance safe drinking water, and reduced crime rate in Uyo Capital City. So, policymakers should prioritize infrastructure development, including road upgrades and water treatment facilities.

The high crime rate in Uyo Capital City underscores the need for enhanced security measures, including increased policing and community engagement. The findings emphasize the need for effective water resource management to ensure access to safe drinking water for all residents.

Sustainable Solutions

Sustainable solutions include encouraging sustainable transportation modes, such as public transport, cycling, and walking, to reduce congestion; implementing water conservation measures, such as rainwater harvesting and efficient water use practices, to reduce water scarcity; as well as engaging with local communities to address poverty and unemployment, and promote crime prevention.

Future Research Directions

Future research directions are focused on conducting longitudinal studies to monitor changes in congestion, safe drinking water, and crime over time; evaluating the effectiveness of policy interventions and sustainable solutions in addressing these challenges; and conducting qualitative research to gain a deeper understanding of the social and cultural factors contributing to these challenges.

Implications for Stakeholders

The findings highlight the need for effective governance and coordination among government agencies to address these challenges.The private sector can contribute to sustainable solutions by investing in infrastructure development and promoting sustainable practices, and the civil society organizations can play a crucial role in promoting community engagement and advocating for policy changes.The findings of this study have significant implications for stakeholders and policymakers seeking to address the challenges of congestion, safe drinking water, and crime in Uyo Capital City.

V. Conclusion

This study examined the challenges of congestion, safe drinking water, and crime in Uyo Capital City. The findings revealed significant gaps in infrastructure, water supply, and security, highlighting the need for effective policy interventions and sustainable solutions. The study's recommendations emphasize the importance of urban planning, security measures, water resource management, and community engagement in addressing these challenges.

Summary

- Congestion is a major challenge in Uyo Capital City, with inadequate road infrastructure and poor traffic management being key contributing factors.
- Access to safe drinking water is limited, with inadequate water treatment and poor sanitation being major factors.
- Crime is a significant security challenge, with poverty and unemployment being key contributing factors.
- The study's findings have significant implications for policy interventions, sustainable solutions, and future research.

Recommendations

The study recommends:

i. The upgrade of road infrastructure to reduce congestion.
ii. The improvement of water treatment and sanitation to increase access to safe drinking water.
iii. The implementation of policies to address poverty and unemployment to reduce crime.
iv. Investment in infrastructure development and promotion of sustainable practices.
v. Engagement with local communities to address poverty, unemployment, and crime prevention.
vi. Promotion of community engagement and advocate for policy changes.
vii. The encouragement of sustainable transportation modes, such as public transport, cycling, and walking.

The recommendations are based on the study's findings and are aimed at addressing the challenges of congestion, safe drinking water, and crime in Uyo Capital City.By implementing them, Uyo Capital City can address the challenges of congestion, safe drinking water, and crime, promoting sustainable development and improving the quality of life for its residents.

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