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Appraisal of the Effects of Logistics Infrastructural Facilities at the Internally Displaced Person (IDP) Camps in North-Central, Nigeria

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Abstract

This study appraises the effects of the type and condition of logistics infrastructure on IDP camps in North Central Nigeria. The study utilised a quantitative research design and purposive sampling technique was used to select the states in the North Central Nigeria which have about 71 IDPs camps. Taro Yemane formula was used to determine 397 questionnaires which were distributed to the IDPs at the IDP camps using random sampling techniques. The study made use of frequency, percentages, and mean index score to analyse the data collected from the field survey, while the hypothesis was analysed using Chi-square analysis. The study results show that shelter facilities, food and material warehouse, water and sanitation facilities, health clinics and transportation facilities and distribution equipment are the major logistics infrastructure available at the camp. In addition to the above finding, it revealed that the overall conditions of the available logistics infrastructure across the IDPs camps are in poor condition. The study therefore concluded that there is a significant deviation between the observed and expected frequencies, indicating that the type and condition of logistics infrastructure in place at the IDP camps in the rural and urban areas in North Central Nigeria are not independent.

Keywords: IDPs, IDP camps, Logistics Infrastructure, North Central Nigeria, Relief materials, Shelters

1. Introduction

Conflicts caused by ethno religious, occupational, and boundary issues, as well as well as natural and human calamities, have become a burden in modern society (Ajiboye, 2023, Okoi, 2021, Guha-Sapir *et al,* 2015). Conflicts and natural catastrophes occur at a high frequency and have a significant impact on host communities on a daily basis around the world (Topluoglu, *et al*, 2023, Khan, *et al,* 2023, Caso, *et al*, 2023, Food and Agriculture Organization of the United Nations, (FAO), 2018). Numerous natural and man-made

catastrophes have been striking Nigeria, such as floods, cyclones, thunderstorms, coastal erosion, drought, landslides, tidal waves, wildfires, infestations of insects and locusts,

and more (Omoge, 2023, Ajiboye, *et al,* 2022, National Emergency Management Agency (NEMA), 2018, 2013, El-ladan, & Abdulrashid, 2012).

Human-caused disasters have occurred in Nigeria on a number of occasions in the past. These include air crashes, water disasters (boat capsising), rail accidents (derailment), road accidents, epidemics (COVID-19), buildings falling because of flimsy constructions, and administrative inaction. Other issues include civil war, fire outbreaks, pollution, desertification, insurgency, kidnapping for ransom, bombing of buildings (such as the United Nations building in Abuja), vandalism of oil pipelines by bunkers, and conflicts arising from employment and ethnicity for political, economic, and religious reasons (Olanrewaju, 2018; NEMA, 2018, 2013, Adegoke, 2015; Joshua, *et al*. 2014).

The impact of disaster in Nigeria has been severe with significant human casualties, property destruction and long term disabilities. Additionally many children have been orphaned and essentials infrastructure including farms and markets have been devastated (Alom & Ogbuene, 2023, Vigaud-Walsh, 2016). Similarly, a significant portion of the population was forced to evacuate conflict or catastrophe areas and relocate to safer zones when disasters occurred (Ajiboye, *et al.,* 2021). In Nigeria, disasters, economic disputes, and ethno religious strife have resulted in several internally displaced people and camps. Since 2017, the largest cause of fresh displacement in Nigeria has been the ethno religious conflict in northeastern Nigeria caused by the terrorist armed group known as Boko Haram/bandits and the military operations against the group. The Internal Displacement Monitoring Centre (IDMC) reported that 2019, there were 248,000 new displacements across 19 states, compared to about 417,000 new displacements in 2018. As an example, there are 26 million displaced people in Nigeria (IDMC-GRID, 2019). However, given the difficulties in other locations and accessibility concerns, the estimates mentioned above are anticipated to be underestimated.

Thus, logistics management is crucial in delivering humanitarian relief to thousands of internally displaced people and refugees in situ or moving (Oloruntoba & Banomyong, 2018). Since it is obvious that improving logistics is essential to maximising humanitarian aid through better preparedness for the crisis. Transportation Demand Management (TDM) of relief and life-saving supplies is required to maximise the timeliness and efficacy of response activities. The development of the logistics strategy can be based on logistics, which can also greatly lessen the impact of the disaster (Kundu, *et al,* 2022; Koseoglu & Yıldırım, 2015; Leiras, *et al*., 2014; Gill, 2012; Kowacs & Spens 2007). Because it allows humanitarian relief workers to focus on their primary responsibilities and enhances the conditions of disaster victims, logistics management is therefore seen as a workable solution for managing disaster relief supplies and staff working hours (Rutaba, 2023; Koseoglu & Yıldırım, 2015). Thus, comprehensive logistics management during calamities is required.

The logistics infrastructure found in IDP camps consists of several components essential to the survival of displaced people (Ohida, *et al.,* 2023; Akawu, *et al,* 2023; Abdul, 2018). Research highlights the significance of robust shelter structures that can endure extreme weather conditions (Liu, *et al.*, 2018). Strong transport systems are also necessary to enable the prompt delivery of relief supplies and to give people access to necessary

services. The health and welfare of displaced people and their families also depend on having enough storage space, adequate water supplies, and sanitary systems. The provision of logistics infrastructure for IDP camps is difficult despite its vital relevance. Infrastructure development initiatives are frequently hampered by a lack of money, bureaucratic roadblocks, and limited resources particularly in camps with high population densities, overcrowding and a lack of adequate shelter space which increases both health risks and vulnerabilities (Akawu, *et al.*, 2023; Abdulrahman, *et al.*, 2014).

The misery of displaced communities is exacerbated by poor road networks and transportation facilities, which impede the provision of relief goods and access to healthcare. Innovative solutions and cooperative alliances are required to address the issues related to infrastructure provision. According to Campbell, *et al*., (2021), displaced communities should be included in the design and building of shelter facilities through the use of participatory planning techniques. By promoting sustainability and ownership, these strategies guarantee that infrastructure satisfies the unique requirements of internally displaced people. Moreover, the improvement of relief operations' effectiveness and access to vital services depend heavily on investments made in transport infrastructure upgrades, such as the extension of distribution networks and road repairs (Campbell, *et al.,* 2021).

The kind and state of the logistics infrastructure have a big impact on how well humanitarian efforts at IDP camps work. A well-planned and maintained infrastructure improves access to healthcare and education, expedites the provision of basic services, and improves well-being overall (Liu, *et al*., 2018). On the other hand, poor infrastructure increases the likelihood of diseases outbreaks and security events, causes delays in the delivery of relief, and hinders logistics, all of which highlight the urgent need for infrastructure improvements (Liu, *et al*., 2018). The appraisal, which examines the infrastructure needs, obstacles, and ideas for improvement, emphasizes the importance of strong infrastructure in supporting relief efforts and improving the welfare of displaced people to meet their needs and ensure they live with dignity. In order to meet the demands of internally displaced people and guarantee their respectable living conditions in humanitarian settings, infrastructure construction and maintenance must continue. It is, therefore, against the backdrop that the present study appraises the effects of the type and condition of logistics infrastructure at the internally displaced persons camps in North central Nigeria whether they are located in rural or urban setting.

2. Literature Review

2.1. Concept of Internally Displaced Person Camps

Disaster has been interpreted in a variety of ways by academics and professional associations (Chmutina & von Meding 2019; Kim & Sohn,. 2017; Schenker-Wicki, *et al,* 2010). A disaster is defined as a severe catastrophic event that impairs a society's ability to function and results in losses in terms of people, property, and the environment that are greater than what the affected population could reasonably recover from on their own (Ogie, & Verstaevel, 2020, Ajiboye, *et al.,* 2015a, EM-DAT, 2015). However, according to Ajiboye, *et al*. (2015) and Oloruntoba and Gray (2006), a disaster is an unanticipated

event that results in significant harm, devastation, suffering, or even death for many people. As a result, the local communities cannot respond to the situation and must urgently request external assistance at the national, regional, and international levels. Therefore, the present study describes disaster as an event that occurs over time, resulting in loss of life and property and displacing people from their comfort zones to a place that is relatively safe which may be set up by the government, NGO, faith-based organisation or individuals known as an Internally Displaced Persons Camps if it is within a country or refugees camps if they are outside the country.

There are different types of IDP camps all over the world including the North Central Nigeria, based on their location (urban or rural), characteristics, challenges, and best practices. These categories include spontaneous settlements, organised camps, self-settled camps, and host family arrangements (Ajiboye, et al., 2023). Each type reflects different levels of formalisation, community autonomy, and reliance on pre-existing social networks and logistics infrastructural facilities available at the camp. Spontaneous settlements are informal communities that form quickly after displacement events such as natural disasters or conflicts. These settlements are characterized by the lack of official planning or infrastructure, with displaced individuals and families improvising temporary homes using available resources (Erica *et al.*, 2023). The absence of basic amenities like water, sanitation, and healthcare severely impacts the well-being and safety of residents (Johnson *et al*., 2018).

Organised camps are planned and systematically established by aid organisations, local governments, or host communities. These camps are designed with formal infrastructure, including housing units, restrooms, and common areas, and aim to provide a safe and respectful living environment while adhering to international humanitarian standards (Picker & Pasquetti, 2015). Services such as food distribution, healthcare, education, and protection are typically provided (Ehiri *et al.*, 2014).

Self-settled camps, also known as spontaneous self-settlements or informal settlements, are created by displaced individuals or families who establish their own communities and shelters outside of official camp settings. These settlements vary widely in size, structure, and infrastructure, from larger, more established communities with basic amenities to smaller, less developed ones (Vaccari *et al.*, 2020). Residents in self-settled camps often show resilience by organizing their communities, creating livelihood opportunities, and improving infrastructure. The host family arrangements involve displaced individuals or families seeking shelter with friends, relatives, or neighbors instead of living in organized camps or self-settled settlements. This kinship-based support network provides displaced people with a sense of belonging and social support while alleviating the burden on formal humanitarian assistance systems (Caron, 2019).

The rural IDPs camps are located in rural areas where the population is mostly less than 20,000, homogeneous, high level of primary economic activity, inadequate infrastructure facilities, low level of government presence, high poverty rate, and low cost of living while the urban based IDPs camps are located in urban areas with high population, presence of secondary and tertiary economic activities, high presence of government institutions and activities as well as heterogeneous population. This article aims to shed

light on the effects of the availability of logistics infrastructural facilities based on diverse contexts in which displaced populations are housed, and provided for, thereby informing more effective humanitarian responses and policies.

2.2 Theoretical Framework

The system theory idea was proposed in 1950 by Ludwing Von Bertalanffy, a biologist. It is applicable to a wide range of disciplines, including sciences, humanities, and social sciences, because there is evidence of a system in every civilization and scientific subject. The main assumption of the general system theory is that a complex system is made up of multiple smaller systems and it is the interactions between these smaller systems that create a complex system. It is a framework that allows the researcher to explore a phenomenon from a holistic perspective, and the thinking stems from a shift in focus from the part to the whole (Capra, 1997). A system is a self-contained, cohesive entity (Ng, *et al,* 2009). However, in all systems, according to Remeida (2015), three fundamental components are crucial: the environment, the subsystems, and the element. No individual, organisation, nation, entity, or event can function properly without contact with the environment/society. Human beings, organisations, nations, and events are all components of the system, which is also referred to as a subsystem or an element. However, logistics system of internally displaced person consists of components such as infrastructures, communication, control and so on which operate together to ensure that relief items are supplies at the right time. Failure of one of the sub-components may result to inefficiency of the relief materials supply chain.

2.3 Empirical Review of Literature

The Boko Haram insurgency has been recognised for bringing about a decade of conflict, mass displacement, and extensive damage to basic infrastructure in Northeast Nigeria, as stated by Abdullahi *et al*. (2020). This has resulted in over 2 million internally displaced persons (IDPs) enduring poor living conditions, malnutrition, and disease in camps or with host communities. Health facilities have been significantly affected by the conflict, exacerbating challenges in addressing infectious diseases like tuberculosis (TB) and HIV among IDPs while international aid supports some health interventions, locally derived solutions are lacking.

In a separate study, Khan *et al*. (2016) examined the long-term and causal relationship between environmental logistics performance indicators (ELPI) and growth-specific factors across 15 globally ranked logistics countries from 2007 to 2015. This study is unique in its incorporation of various logistics performance indicators, including logistics competence and infrastructure, along with sustainable factors such as carbon dioxide (CO2), fossil fuel, and greenhouse gas (GHG) emissions within a region. The findings indicate that CO2 emissions and GHG emissions affect per capita income, industry, manufacturing, and service contributions to GDP. Logistics competence and infrastructure contribute to economic growth and sectoral value added, while energy demand and foreign direct investment (FDI) inflows are essential for sustainable agriculture. The causal relationships suggest that increased energy demand leads to higher economic growth, industry value added, and service sector expansion (referred to

as the feedback hypothesis), while a sustainable supply chain system enhances energy demand, FDI inflows, economic growth, and sectoral growth (known as the conservation hypothesis) across the panel of countries.

Nowicki *et al.* (2008) aims to address this gap by developing an optimization model for spare parts provisioning under a multi-item, multi-echelon scenario, with the objective of maximizing profit to the supplier under a PBL contract. In a PBL framework, the emphasis shifts from purchasing specific resources to acquiring performance outcomes such as operational availability, mission readiness, and operational reliability. Despite the growing interest in PBL, the literature remains nascent, necessitating further research to optimize logistics resources like spare parts, equipment, facilities, and labour within a PBL context. They suggest that performance-based logistics (PBL) is gaining prominence as a preferred

strategy for logistic support, particularly within the public sector like the Department of Defense.

Najafi, *et al.* (2014) presents a dynamic model for dispatching and routing vehicles in response to earthquakes, focusing on transporting commodities to affected areas and injured individuals to hospitals. Experiments are designed to assess the impact of network topology on response speed, aiming to enhance the quality of earthquake response. They argued that the unpredictable and devastating nature of earthquakes requires governments of disaster-prone regions to develop practical response plans to minimize damage and losses. Logistics management, particularly in terms of planning transportation for required commodities and evacuating injured individuals, is crucial for an effective response. The proposed model can adjust plans based on updated information, prioritizing speed to ensure timely arrival at hospitals for injured individuals and fulfilling commodity needs promptly.

Hassan & Mohamed (2023) stated that Gender-based violence (GBV) against women and girls is a widespread issue globally, affecting approximately one-third of women during their lifetimes. Somalia stands out as a country with high rates of human rights violations, particularly in terms of sexual and gender-based violence (SGBV), ranking among the highest worldwide. This violence is particularly prevalent among women and girls residing in internally displaced persons (IDP) camps who lack adequate livelihoods and civil protections. Consequently, the research was aimed to assess the occurrence and underlying factors of gender-based violence in IDP camps within the Deynile district of Somalia. The study conducted from August 1 to September 30, 2022, employed a cross-sectional design, involving 384 women and girls aged 18 and above residing in selected IDP camps. Camps were chosen randomly, with households and participants selected through systematic random sampling. Participants were interviewed using a pre-tested structured questionnaire by well-trained research assistants. Data analysis was performed using SPSS 25.0, employing logistic regression with a significance level set at $p \leq 0.05$. Findings revealed a prevalent occurrence of gender-based violence in the IDP camps of Mogadishu's Deynile area, with physical abuse being the most common type, mainly perpetrated by intimate partners, parents, and other family members. Factors significantly associated with gender-based violence included young age, extended family

structure, larger household size, employment status, substance misuse, distance to the nearest police station, and adequacy of camp safety protection. The study underscores the urgent need to address modifiable factors strongly linked to gender-based violence in the IDP camps of Mogadishu's Deynile area.

Asabe, *et al.* (2022) noted that the conflict between Nigerian state armed groups and non-state armed groups has led to over 2.1 million Internal Displaced Persons (IDPs) residing in camps and host communities. Concerns have arisen regarding the adequacy and functionality of latrine facilities in IDP camps, particularly in providing relief to vulnerable populations such as women and children. This study evaluates the latrine facilities and their associated health implications in selected official IDP camps in Borno State, Nigeria. A structured questionnaire was administered to respondents from twelve out of sixteen official camps in the area, with 331 well-filled questionnaires received out of 392 distributed (an 84.4% response rate). Data analysis was conducted using SPSS version 19.0. Findings revealed that the predominant type of latrine in the camps is the traditional pit latrine which are mostly fewer than forty latrines per camp as indicated by respondents. De-sludging of latrines typically occurs once every two months, contrary to UNHCR and SPHERE standards. The most commonly reported illnesses in the camps, ranked by severity, include diarrhea, sexually transmitted diseases (STDs), fever, and tuberculosis. Recommendations include strict adherence to latrine construction standards such as those set by UNHCR and SPHERE to mitigate the spread of diseases in the camps.

Startsev, *et al.* (2022) emphasise the importance of ensuring security and reliability in military camps, which necessitates adapting appropriate measures to the specific conditions of each region. The organization and maintenance of field camps primarily revolve around security considerations, operating as integrated systems initially providing basic services and facilities with the ability to adapt over time. The camps consist of service and logistics infrastructure, with variations in duration of usage ranging from mobile (short-term) to typical (up to a year) and foreign garrisons (long-term). The key challenge lies in deploying combat units and equipment without extensive preparation of infrastructure. The article presents an analysis, principles, and approaches to constructing necessary infrastructure for field deployment of armed contingents of NATO armies during missions, including the structure of a modern universal mobile logistics support complex. It also discusses global developments in personnel location and life support systems during combat tasks, providing recommendations for improving logistical support in modern armed conflicts through modular field camp systems.

Yani, *et al*. (2022) argue that in the realm of humanitarian aid for forcibly displaced populations, the establishment of camps is crucial for ensuring their protection, survival, and well-being. A significant challenge lies in determining optimal locations for setting up new camps for asylum-seekers, unrecognized refugees, or internally displaced persons (IDPs). This paper frames this issue as a variation of the facility location problem (FLP) with three objectives to optimise. Specifically, the authors demonstrate how artificial intelligence (AI) techniques and migration simulations can be leveraged to offer decision support in determining camp placement.

Jude, *et al.* (2021) investigated the knowledge, perceptions, prevalence of pre-existing conditions, and access to essential resources related to COVID-19 among residents of internally displaced person (IDP) camps in Somalia. The study, conducted through a descriptive, cross-sectional survey across twelve IDP camps in the Lower Shabelle region, included 401 adult Somali IDP camp residents, the majority of whom were female (86%) and lacked formal education (89%). Despite 58% reporting "good" health, half reported having one or more pre-existing conditions. While 77% reported taking at least one COVID-19 preventative measure, access to adequate sanitation, ability to practice social distancing, and availability of COVID-19 screening exams were limited. Approximately 50% of respondents were uncertain about COVID-19 prevention and treatment knowledge. Many were unfamiliar with basic virus information and lacked confidence in accessing medical services if infected. Nearly half of the respondents expressed the need for changes in camp living conditions to prevent COVID-19 spread. The study underscores the need for increased resources and tailored interventions to address COVID-19 knowledge gaps and resource access in Somali IDP camps.

The Boko Haram insurgency has resulted in Nigeria having the highest number of internally displaced persons (IDPs) in Africa, particularly concentrated in the NYSC camp in Girei Local Government, Adamawa State. Segun *et al*. (2021) argued based on forced migration theory and utilising primary and secondary data, that the conditions in this camp are dire, with IDPs lacking access to basic necessities. They emphasize the necessity for the government to prioritize the welfare of IDPs and address corruption among officials, which exacerbates the already poor conditions. In their study, Abdullahi, *et al*. (2020) evaluated the impact of an active case finding (ACF) intervention for TB and HIV testing in IDP communities across three states in Northeast Nigeria. The intervention involved collaboration between government, civil society, and IDP community partners, including mapping IDP populations and health services, supporting existing health facilities, and organizing community outreach. Over the intervention period, ACF was conducted in numerous IDP camps and host communities, resulting in significant screening encounters and tests conducted for TB and HIV. The study detected a considerable number of TB and HIV cases, with successful linkages to treatment services. Importantly, the intervention substantially increased TB case notifications, indicating its effectiveness in addressing TB within IDP populations. However, the study acknowledges limitations such as non-random selection of areas and potential underestimation of TB cases due to the absence of sensitive screening tools. Despite these limitations, the findings underscore the importance of engaging IDP communities, local governments, and civil society organizations in efforts to combat TB and HIV among vulnerable populations in conflict-affected regions like Northeast Nigeria.

Butt *et al.* (2020) noted that while the Belt and Road Initiative (BRI) has garnered considerable attention in economics and political sciences, there has been a lack of research examining its impact on supply chain management. Given the scale of the BRI as a logistics infrastructure project, it is evident that it will have significant implications for supply chains. This study aimed to address this gap in the literature by investigating the potential challenges and threats that the BRI may pose to supply chain management. Through 20

semi-structured interviews with supply chain managers in South Asian countries along the BRI route (such as Pakistan, India, Bangladesh, etc.), the study identified six distinct implications of the BRI for logistics and supply chain management. The article concludes by discussing its contributions to both theoretical understanding and practical applications, as well as outlining limitations and suggesting directions for future research.

Daniel & Hellingrath (2015) assert that humanitarian logistics assessment is aimed at swiftly gathering precise information about areas affected by disasters, including details about infrastructure and logistical resources necessary for humanitarian operations. Despite its importance, assessment practices have been scarcely researched. This paper organizes practical knowledge from the field and makes it accessible to the research community by examining assessment tools and guidelines used by humanitarian aid organizations regarding infrastructure and logistics. Using an inductive category development approach, the authors analyse these documents, categorizing them into comparable information fragments. Based on this foundation, they outline three assessment phases: preparedness, rapid response, and ongoing response, detailing the information to be assessed during each phase and how these assessments are interconnected. The findings provide a basis for developing comprehensive theories on infrastructure and logistic resource assessments and suggest avenues for standardizing assessment tools within humanitarian aid organizations to expedite assessment processes and facilitate information sharing.

Samar *et al.* (2017) express the United Nations High Commissioner for Refugees (UNHCR) estimate that the average period of forced displacement lasts 17 years, leading many refugees and IDPs to spend considerable time in camps. Consequently, camps are increasingly seen as potential long-term settlements rather than temporary relief measures, yet planning and resource allocation for camps have not kept pace with this recognition. Particularly in terms of shelter, a fundamental human need, there is minimal architectural infrastructure and short-term urban planning in place. As a result, camp residents often have to repurpose humanitarian storage facilities into essential dwellings, markets, and community spaces. This paper presents observations and survey results on shelter conditions from three camps in northern Iraq, illustrating the range of shelter types stemming from economic and political considerations and identifying opportunities for information and communication technologies (ICTs) to enhance the quality of life for millions of displaced individuals.

Flávio *et al.* (2014) asserted that the success of humanitarian operations heavily relies on humanitarian logistics, which utilize various infrastructure and resources in highly volatile environments. They highlighted the importance of accurate and timely information, which must be aligned with the real conditions of the affected area. In this regard, volunteered geographic information (VGI) from local members of NGOs or individual citizens emerges as a crucial information source. The paper proposes a conceptual framework that connects supply chain management (SCM) processes of humanitarian organisations with VGI to enhance the identification of necessary information regarding infrastructure and resources for humanitarian SCM processes. The central element of this framework is the Humanitarian Logistics Infrastructure and

Resource Model, which aims to encapsulate information and facilitate the integration of SCM and VGI systems.

Ngwa *et al.* (2020) discussed a cholera outbreak that began in August 2017 at the Muna Garage Internally Displaced Persons camp in Borno state, Nigeria, resulting in over 5000 cases across six local government areas. Their qualitative study evaluated the emergency response to this outbreak. They conducted 39 key informant interviews and focus group discussions, and reviewed 21 documents with participants involved in various sectors. The analysis revealed that although authorities were quickly alerted, the outbreak declaration was delayed by 12 days due to waiting for culture confirmation. The response faced challenges such as delayed repair of a leaking latrine, initial community resistance to chlorine due to misconceptions, and language discrepancies in key messages. The study recommended pre-outbreak planning exercises, inventory sharing, and rapid formative research to improve emergency responses. Despite initial coordination challenges, the activation of an emergency operations center (EOC) improved coordination, emphasizing the importance of recognizing the government's leadership role.

Hazem, *et al*. (2018) emphasised the critical importance of promptly providing drinking water to affected populations following a disaster. Their paper aimed to develop an optimisation methodology for distributing drinking water in post-disaster scenarios. The research comprised two phases: the first phase focused on identifying the most suitable method for delivering drinking water to refugee camps from external sources, considering required quantities and assessing four potential water sources based on cost and risk. The second phase explored distribution within a refugee camp using covering models. They proposed the MCLP (Maximum Covering Location Problem) – optimal number of facilities model to ensure equitable water distribution to all individuals in a camp with the minimum necessary number of water storage tanks. Additionally, a control policy was suggested to ensure fair water distribution. The Al-Za'atari refugee camp in Jordan served as the case study, revealing that tanker-trucks were the most appropriate means of delivering water, and at least five tanks were required for distributing water within the camp effectively. This methodology is crucial for decision-making regarding short-term drinking water distribution in refugee camps, providing a novel solution to a problem not previously addressed in the literature.

Russo & Trecozzi (2012) discussed emergency logistics as a process for organising and distributing resources during disasters to mitigate their impacts, whether natural or human-induced. They highlighted the importance of ongoing planning during emergency conditions to sustain evacuation efforts beyond the initial disaster impact. Their focus was on identifying and allocating resources, particularly relief vehicles, within the affected area according to essential tasks. They proposed two distribution channel models: transshipment, where relief vehicles converge at a single contact point before proceeding to the emergency area, and point-to-point, where relief vehicles travel directly to the emergency area without intermediate stops. Ajiboye (2023) contend that individuals affected by armed conflicts and natural disasters in developing nations may face double vulnerability, experiencing simultaneous exposure to both types of crises. In 2013, for instance, over four million internally displaced persons resulting from the

armed conflict intersected with millions affected by floods in 2010 and 2011, creating overlapping populations affected by both human-made and natural disasters.

Most of these studies did not discuss the availability and the usefulness of these logistics infrastructure at the internally displaced person (IDP) camps. It is therefore against this backdrop that the present study examined the effects of the type and condition of the logistics infrastructure at internally displaced persons camp in the North central Nigeria.

3. Methodology

The research design adopted for this study is essentially a quantitative survey. Purposive sampling technique was used to pick the six states of the north central Nigeria for the investigation. The study population comprises of the internally displaced person in Benue, FCT, Kogi, Kwara, Nasarawa, Niger and Plateau. The actual population of the IDPs across the Camp is 63,983 IDPs which forms the unit of inquiries across the 76 IDPs camps in the study area. Taro Yemane formula was used to determine the sample size of 397 which was randomly distributed among the chosen respondents. The questionnaire distributed was designed on a five-point Likert scale where 1 -represent strongly disagreed and 5-represent strongly agreed. The collated data was analyzed using frequency, percentages and mean index score while the hypothesis was tested using chi-square statistics.

4. Results and Discussion

4.1 Socioeconomic features of the respondents

To understand the respondents' perception, it becomes very important to understand their demographic characteristics, show the role of males and females in the sampled community and help to understand the ratio of their involvement in the study. Therefore, different demographic and socioeconomic characteristics like household gender, age, occupation, academic qualification, family size income, etc. were studied. As presented in Table 1, a total of 398 respondents responded to the instrument, of which 222 (55.8%) were males and 176 (44.2%) were females. Everyone participated in the study by completing the questionnaire. This shows that the affected respondents' population is predominantly male in the study area. From the age of the respondents studied it can be deduced that 52.8% of the respondents fell between the age bracket of 31-45 years, followed by the respondents between the age of 46-60 years with 26.6%, under 16-30 years with 13.3% and above 60 years with 7.3% respondents respectively. This also indicated that most respondents' ages were adequate to give reliable information on the subject matter.

Table 4.1: Socio-demographic characteristics of the respondents

S/N	Variables	Option	Frequency	Percentage
1	Gender of the Respondent	Male	222	55.8
		Female	176	44.2
		Total	**398**	**100**

2	Age of the Respondents	Under 16-30 years	53	13.3
		31-45 years	210	52.8
		46-60 years	106	26.6
		>60 years	29	7.3
		Total	**398**	**100**
3	Occupation	Civil servant	192	48.2
		Trader/Business	93	23.4
		Farmer	57	14.3
		Self Employed	32	8.0
		Others	24	6.0
		Total	**398**	**100.0**
4	Educational Qualification	Not Literate	8	2.0
		Qur'anic Education	36	9.0
		Primary	46	11.6
		Secondary	104	26.1
		Tertiary	204	51.3
		Total	**398**	**100.0**
5	Marital status	Single	119	29.9
		Married	221	55.5
		Widowed	11	2.8
		Separated	21	5.3
		Divorced	26	6.5
		Total	**398**	**100.0**
6	Household income	Less than 10,000	59	14.8
		10.000 – 19,999	61	15.3
		20,000- 39,999	109	27.4
		40,000 – 49.999	97	24.4
		50,000- 100,000	34	8.5
		100,000- 200,000	20	5.0
		Above 200,000	18	4.5
		Total	**398**	**100.0**

Source: Authors' Fieldwork, 2023

On the occupation of the respondents, out of the 398 respondents, 48.2% were civil servants, followed by Trader/Business 23.4%, 14.3% were farmers, 8.0% were self-employed respondents while the least 6.0% were for others. About the respondents' level of education attainment, 51.3% have tertiary education, 26.1% have secondary education, 11.6% of the respondents have primary school level education, 9.0% have Qur'anic Education while 2.0% were not literate. Furthermore, the result of the marital status shows that 55.5% were married, 29.9% were single, 6.5% were divorced, 5.3% of the respondents were separated and 2.8% were widowed. Lastly, respondents were also asked about their monthly income in Naira. It is very important to determine the income of the respondents, which is interlinked with their economic status. Amongst the respondents, 27.4% have a monthly income ranging from #20,000 - 39,999, ($15-26) and 24.4% of the respondents have a monthly income ranging from #40,000 – 49.999 ($27-33). 15.3% of the respondents
have an income between #10.000 – 19,999 ($7-10), 14.8% have an income of less than #10,000 ($7), 8.5% between #50,000- 100,000 ($33- 67), 5.0% between #100,000-200,000 ($67- 133) and the remaining 4.5% earns about #200,000 ($133) respectively.

4.2 Analysis of type and condition of Logistics Infrastructure

Table 2 shows the mean ratings and standard deviation on the logistics infrastructure types and conditions in place at the IDP camps in the rural and urban areas in North Central Nigeria**.**The table indicates that respondents agree to the inadequate shelter facilities, food and material warehouse, water and sanitation facilities, health clinics, educational centres, transportation facilities and distribution equipment, ICT centre and security measures like checkpoints, security personnel, etc., as seen in items 1, 2, 3, 4, 5, 6, 7 and 8 in the Table 2 with mean scores of 4.78, 3.56, 3.60, 2.94, 3.30, 3.95, 2.87 and 3.42 respectively. Though the respondents who
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Table 4.2: Mean ratings and standard deviation on Logistics Infrastructure types and Conditions in Place at the IDP Camps in the Rural and Urban Areas in North Central Nigeria.

S/N	Variables	Respondents' Responses					
		Urban IDPs=197		Rural IDPs=201		$\bar{X}_1\bar{X}_2$	Remark
		$\bar{X}_1$	$S.D1$	$\bar{X}_2$	$S.D2$		
1	Shelter facilities	5.00	0.00	4.56	0.50	4.78	Accepted
2	Food and material warehouse	4.55	0.50	2.56	0.51	3.56	Accepted
3	Water and sanitation facilities	4.46	0.58	2.75	0.43	3.60	Accepted
4	Health clinics	3.89	0.89	1.99	0.62	2.94	Accepted
5	Educational centres	4.26	0.77	2.33	0.47	3.30	Accepted
6	Transportation facilities and distribution equipment	4.55	0.50	3.34	0.60	3.95	Accepted
7	ICT centre	3.18	0.39	2.55	0.50	2.87	Accepted
8	Security measures like checkpoints, security personnel, etc.,	4.38	0.64	2.46	0.50	3.42	Accepted
	Grand mean	**4.28**	**0.53**	**2.82**	**0.52**	**3.55**	

Source: Authors' field survey Data 2023

are the Internally Displaced Persons who are residing in the rural areas in the North Central Nigeria disagree to items 2, 3, 4, 5, 7 and 8 as seen in their corresponding mean scores of 2.56, 2.75, 1.99, 2.33, 2.55, 2.46 and with the grand mean of 2.82. An indication of worst logistics iinfrastructure types and cconditions in place at the IDP Camps in the rural areas in North Central Nigeria contrary to that of the urban areas. In all, the grand weighted mean value of 3.55 indicates that the answer

to research objective is that logistics infrastructure types and conditions in place at the IDP camps in the rural and urban areas in North Central Nigeria are relatively adequate but there are many IDPs in the camps than the available logistics infrastructure facilities and therefore need urgent attention**.**

4.3 Perceptions on the condition of the relief material logistics infrastructure

Table 3 shows the respondent's perceptions on the condition of the relief material logistics infrastructure in place at the IDP camps in the rural and urban areas in North Central Nigeria. the findings of the study showed that there are problems with: access roads, vehicle availability, warehouse, material handling equipment, information and telecommunication technology facilities and telecommunication network,s as seen in items 1, 2, 3, 4, 5 and 6 with the weighted

mean ratings of 3.24, 3.83, 3.07, 3.06, 3.13 and 4.39. The grand weighted mean value of 3.45 shows the poor condition of the relief material logistics infrastructure in place at the IDP camps in the rural and urban areas in North Central Nigeria. For instance it is very difficult reaching Pegi, Dobi, Shere and Ushafa IDP camps despite the facts that they are located within the FCT.

Table 3: Respondents perceptions on the condition of the relief material logistics infrastructure

S/N	Variables	Respondents' Responses					
		Urban IDPs=197		Rural IDPs=201		$\bar{X}_1\bar{X}_2$	Remark
		$\bar{X}_1$	$S.D1$	$\bar{X}_2$	$S.D2$		
1	Access road	3.95	0.88	2.53	0.50	3.24	Accepted
2	Vehicle availability	4.50	0.50	3.15	0.36	3.83	Accepted
3	Warehouse	3.69	0.86	2.44	0.50	3.07	Accepted
4	Material handling equipment	3.31	0.63	2.82	0.39	3.06	Accepted
5	Information and Telecommunication Technology facilities	3.34	0.48	2.93	0.26	3.13	Accepted
6	Telecommunication Network	4.77	0.42	4.00	0.00	4.39	Accepted
	Grand mean	**3.93**	**0.63**	**2.98**	**0.34**	**3.45**	

Source: Authors' field survey Data 2023

4.4 Hypothesis

Ho: The type and condition of logistics infrastructure in place at the IDP camps in the rural and urban areas in North Central Nigeria are functions of government funding, and other factors. Such as the location of IDP camp, number of IDPs present in the camps, aid from the local and international NGOs, level of security, camp management, conflict severity, local government support, and environmental factors.

A Chi-square test was conducted to examine the association between the type and condition of logistics infrastructure in place at the IDP camps in the rural and urban areas in North Central Nigeria in Table 4. The sample comprised 398 participants, and the test revealed a statistically significant relationship, χ^2 (20, N = 398) = 394.400, $p < .01$. Therefore, the hypothesis, stating there is significant association between the type and condition of logistics infrastructure in place at the IDP camps in the rural and urban areas in North Central Nigeria, was accepted. This outcome suggests a significant deviation between the observed and expected frequencies, indicating that the type and condition of logistics infrastructure in place at the IDP camps in the rural and urban areas in North Central Nigeria are not independent. For Instance The IDP camps located in the urban areas such as Abuja, FCT (New Kuchingoro *IDP Camp,* Area One *IDP Camp);* Makurdi (North Bank I, North Bank I and Agan), Jos (Zawan 'A'Tudun Wada - Kabong;Lafia

(Shabu/Kwandere, Gayam, Makama) are better equipped with logistics infrastructure than the ones located in the rural areas such as Mbanyumangbagh, Mbawa, Ikyaghev, Mbagber (Benue State) Gwada, Kuta, Kagara (Niger State); Gurku. Koso, Tunga, Amiri, Aso/Kodape (Nassarawa State); Bokkos, Riyom, Heipang (Plateau State) and Lugbe, Kuje, Wassa*, Pakon Kore, Ozoro (Abuja FCT)*.

Table 4: Chi-square analysis of the type and condition of logistics infrastructure in place at the IDP camps in the rural and urban areas in North Central Nigeria.

Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	394.400	20	.000
Likelihood Ratio	545.203	20	.000
Linear-by-Linear Association	283.808	1	.000
N of Valid Cases	398		

14 ells (33.3%) have expected count less than 5. The minimum expected count is .49.

5.1 Conclusion and Recommendations

This study focuses on the type and condition of the logistics infrastructure available at the internally displaced person camps located in the rural and urban areas in North-Central Nigeria, as well as measuring the perception of the state of the infrastructures. The study outcome enables the authors to conclude that shelter facilities, food and material warehouses, water and sanitation facilities, health clinics, educational centres, transportation facilities and distribution equipment are some of the available logistics infrastructures across the IDPs camps in North-Central. However, the IDP camps located in the urban areas such as Abuja, Makurdi, Jos, Lafia are better equipped with logistics infrastructure than the ones located in the rural areas. Also, the study concluded that access roads, vehicle availability, warehouses, and material handling equipment, among others, are in a bad state in most of the IDP camps but worst in the rural areas.

The study therefore recommended that;

1. There is a need for tailored improvements in the elements of logistics infrastructure to address the differing conditions between rural and urban IDP camps.
2. The lower mean score for access roads in rural areas (2.53) highlights the need for better road transport infrastructure to facilitate the timely delivery of relief materials, improve mobility and better access to healthcare services and educational facilities which are needed to support the well-being and development of displaced individuals.
3. The need to provide clean water, adequate sanitation, and strengthened security to improve living conditions and safety in rural IDP camps.

4. Secure and adequate storage facilities which are closer to IDP camps and also within the camps for efficient material management should be developed.
5. There should be an efficient and effective closely collaboration among the stakeholders with the rural communities to better support and provide the necessary logistics infrastructure and to integrate IDPs into the host communities.
6. Prioritization of improve vital infrastructure at IDP camps, especially in rural areas should be encouraged.
7. Finally there should be implementation policies through the prioritizing of funding and resources for logistics, security, and camp management improvements.

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