

## Article

# Water Resources, Forced Migration and Tensions with Host Communities in the Nigerian Part of the Lake Chad Basin

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**Abstract:** The Lake Chad region is facing a nexus of interconnected problems including fragility, violent conflict, forced displacement, and scarcity of water and other resources, further aggravated by climate change. Focusing on northeast Nigeria, this study aims to answer the following questions: (1) What role does access to water and farming play in out-migration and return in northeast Nigeria? (2) What is the potential of tensions between internally displaced persons (IDPs) and host communities? Data for this study were collected between March and May 2019 by interviewing 304 local residents and IDPs in northeast Nigeria, as well as experts on migration, environmental, humanitarian and conflict-related issues in research centers and governmental institutions in Abuja. Given the pronounced water scarcity in the region, the results show that between 47% and 95% of rural community members interviewed in northeast Nigeria would be willing to migrate in cases of water scarcity. At the time of study, only 2.5% to 7% of respondents had migrated previously in response to water scarcity, indicating that insecurity and conflict were, however, more relevant drivers of displacement. Regarding our second research question, we find a potential for tensions between IDPs and host communities, as 85% of the interviewed host community members oppose the presence of the IDPs. Hence, measures are needed to improve relations between the two groups. In order to avoid a future scenario where water scarcity becomes a significant driver of migration, efficient management of water resources is paramount. Such action would not only address the issue of migration, but also strengthen the resilience of communities in northern Nigeria.

**Keywords:** water; migration; agriculture; tensions; Lake Chad basin; Nigeria



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## 1. Introduction

The Lake Chad region is a crisis hot spot suffering from a nexus of interconnected problems, including the lack of essential infrastructures like water, food or energy, and multiple drivers of social and political fragility, such as poverty, unemployment, inequality or exclusion of communities. Together, they contribute to insecurity, violent conflict and forced displacement, providing a fertile ground for armed groups like Boko Haram [1]. Human livelihood conditions are aggravated by climate change and other environmental stressors, such as rainfall variability, droughts, desertification, deforestation and declining soil, water availability, and arable land in a degraded Lake Chad basin. Unsustainable management and violent conflict aggravate the disruption of water infrastructure and access to clean water for households and agriculture for a growing population, contributing to food insecurity for millions of people and displacement of hundreds of thousands in northeast Nigeria.

The southern part of Nigeria enjoys abundant water resources; however, the northern part only receives three to four months of rainfall a year, and the population has limited access to water [2–4]. Such disparities in access to water between regions within the same country are seen as a failure of the state to harness these resources effectively, and subsequently ensure sustainable and equitable access to safe, adequate, improved and affordable water supply for its populace [5]. Part of the failure is attributable to a highly underdeveloped water supply infrastructure in a region that traditionally is sensitive to water problems and vulnerable to climate change [6–8]. As rainfall is limited, people mostly rely on groundwater sources for their livelihood. Such a reliance on groundwater in a region can contribute to unsustainable use of groundwater resources [6]. The overexploitation of groundwater resources may also be attributed to the fact that agriculture, as the main income generating activity in the region, is responsible for the usage of up to 70% of available water, making it difficult for communities to find suitable water for household purposes [9,10]. As a consequence, stress may undermine human livelihoods and essential living conditions [11].

In the most affected and vulnerable communities with low adaptive capacities, people may tend to migrate to nearby communities or to cities, where they may have better access to water resources [12]. Migration is a complex phenomenon and driven by a combination of several push and pull factors [13–16]. A key push factor of migration in northeast Nigeria and in other parts of the Lake Chad region (including Cameroon, Chad and Niger) is the insecurity caused by terrorist activities of Boko Haram. Claiming to fight for a better practice of Islam and rejecting western civilization, this group has engaged in atrocities, claiming thousands of lives in the most remote parts of northeast Nigeria [17,18]. Based on a UNHCR [19] assessment, the insecurity created by the insurgency of Boko Haram and the counter insurgency by state military forces have pushed 1.8 million people in northeast Nigeria to migrate in search of safety [20].

The presence of internally displaced persons (IDPs) may in turn contribute to tensions and even conflicts between said IDPs and members of their host communities (e.g., [21,22]). However, there is currently limited scientific knowledge available on both the perception of host community members on IDP presence and the role water availability plays in migration. The present study addresses this research gap. Specifically, we aim to answering the following questions and the linkages between them: (1) What role does the access to water and farming play in out-migration and return in northeast Nigeria? (2) What is the potential of tensions between IDPs and host communities?

The remainder of this paper is structured as follows: Section 2 introduces the concepts and methods used, including a conceptual framework and data collection. Section 3 presents and discusses the results. Section 4 concludes and recommendations for policy makers are given.

## 2. Concepts and Methods

### 2.1. Conceptual Framework

The conceptual framework deployed in this paper derives the potential relationships between the scarcity of water and human migration. In general terms, migration is the movement of people for an extended period of time, with multiple causes and effects which interact in complex ways. In the context of northeast Nigeria, our focus is on forced displacement which is mostly internal and driven by various factors affecting the loss or degradation of livelihoods, such as violent conflict, poverty, famine, environmental change, resource scarcity and natural disasters [23]. In this nexus of drivers of migration, our focus is on the role of water scarcity, which is defined as the inadequate, constrained or lacking access to sufficient quantities of water for human and environmental uses [24,25] (see also [26]).

In the context of northeast Nigeria specifically, Kuhnt [27] classifies factors that lead to migration on the macro-level, the meso-level and the micro-level. On the macro-level, drivers include violent conflict and insecurity, the violation of human rights, the weakness

of institutions and poor governance practices, lack of economic opportunities and finally, changes in the natural environment and natural hazards [27]. On the meso-level, drivers of migration mainly include migration networks which can be defined as “sets of interpersonal ties that connect migrants, former migrants, and non-migrants in origin and destination areas through ties of kinship, friendship, and shared community origin” ([28], p. 42). The micro-level includes education level, age and gender [27]. The International Organization of Migration [29] adds that internal migration has the purpose or effect of establishing a new residence and may be temporary or permanent in nature.

To address the main pathways in the migration-conflict-resource nexus, we follow the framework of Freeman [30] which uses five different scenarios to illustrate pathways with migration as an intermediate factor between environmental change and conflict (Table 1). Two of the five scenarios are relevant to the current study. In scenario 2, the scarcity of resources caused by environmental change may lead to migration which in turn affects conflict; and in scenario 5, independently occurring climate change and migration may connect to conflict. Freeman’s model is chosen because it connects the key variables of resource scarcity, migration and conflict, and furthermore it recapitulates the scenarios observed in the study area. Other possible models applicable in this study are the push-pull model by Ravenstein [31] and the human security framework (e.g., [32,33]), which are however limited in the context of the current study as they do not assess conflict or tensions at the receiving location.

**Table 1.** Pathways with migration as a variable connecting environmental change and conflict. Source: [30].

Pathways connecting environmental change, migration, and conflict
<b>Scenario 1:</b> Abundance
Environmental change → migration → conflict
<b>Scenario 2:</b> Scarcity
Environmental change → constrained migration → conflict
<b>Scenario 3:</b> Conflict-induced migration
Conflict → migration → environmental degradation → conflict
<b>Scenario 4:</b> Environmental degradation as a method of conflict
Conflict → environmental degradation → (constrained) migration
<b>Scenario 5:</b> Independently occurring climate change and migration lead to conflict
Climate change + migration → conflict

Freeman [30] considers that the linkages from environmental change to migration and to conflict may not necessarily happen in a linear trajectory. The effects of environmental changes may contribute to migration and, along with other proximate variables, to conflict. In this scenario, refugees, IDPs and individuals who escape from war do not, in general, relocate to ‘free’ spaces but instead come to act as competing parties with pre-established groups, with the potential of generating conflict at the host site [30]. Along with this migration pathway, competition for access to environmental resources, such as fertile land and freshwater, may lead to tensions between host and migrating communities with the potential to fuel preexisting local tensions.

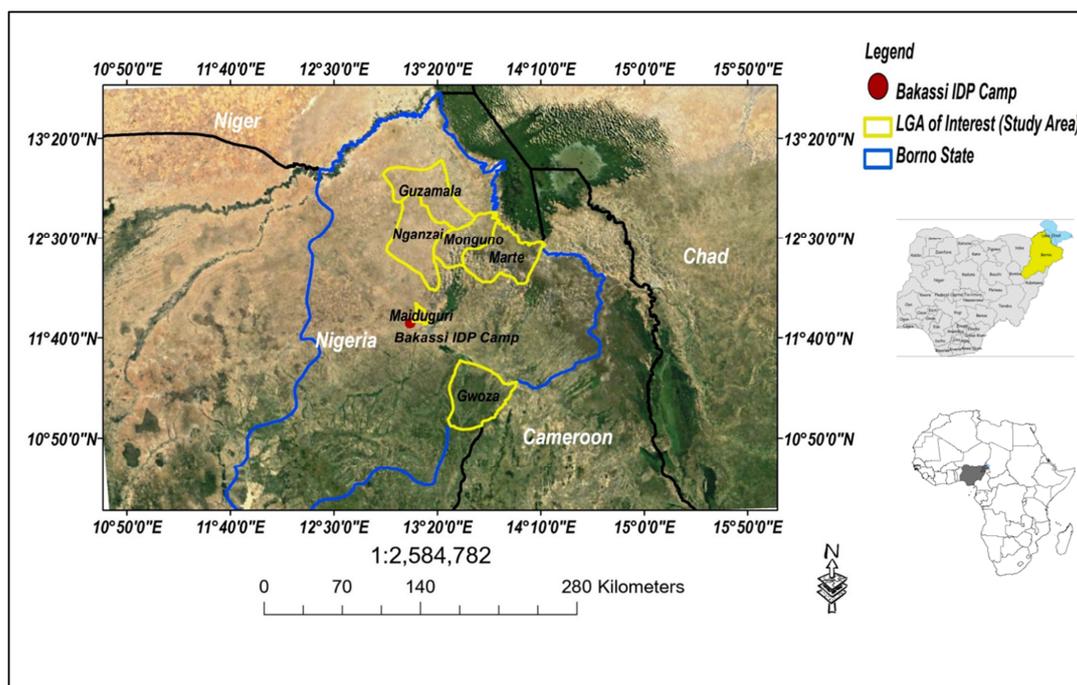
In scenario 5, environmental change and migration occur on separate pathways but can combine to increase conflict risk. In Nigeria, besides the fact that pressure put on resources by displaced persons may lead to conflict with host communities, coexistence between different religious and ethnic groups also constitutes a possible reason for conflicts in the country [34]. Indeed, ethnic and religious relationships in Nigeria have been associated with violent conflicts, leading to high death tolls, forced displacements and extensive property loss, in addition to disruption of economic, social and cultural livelihoods which further incites fear, anxiety, uncertainty and mutual suspicion among communities [34]. While migration brings together people from different ethnic groups and religious affiliations, does this also imply that migration is a direct reason behind conflict?

The literature suggests that efforts can sometimes be conjugated by different communities to adapt and overcome their challenges, rather than engaging in conflict [35,36]. It is shown that instances of water cooperation on the interstate as well as intrastate levels far outnumber instances of water conflict [37,38]. Cooperation, resilience, environmental security and peace-building are also highly important in managing risk, instability and conflict [39]. One focus of our study is how migration and conflict in Northeast Nigeria are affected by water availability in the region which may be a result of poor management and conflict as well as climate change.

Whether society responds to instances of water scarcity in conflictive or cooperative ways may be informed by lessons derived from the body of literature on water and environmental conflict, as well the recent work on the climate-conflict nexus (e.g., [35,40,41]). Here, mechanisms and conditions are identified under which environmental conditions and climate change increases conflict risk or, alternatively, counteracting responses lead to cooperation, innovation and transformation. The following analysis aims to provide small-scale empirical insights on some of the connections in the migration–conflict–water nexus based on data for the case study region northeast Nigeria.

## 2.2. Research Area

Data in this study were collected in six communities of northeast Nigeria (Figure 1) including five rural communities (Guzamala, Gwoza, Marte, Monguno and Nganzai) and one urban community (Maiduguri). Respondents from the rural communities were interviewed in the Bakassi IDP camp in Maiduguri, and respondents from the urban community were interviewed in their local community. The Bakassi IDP camp was created to host IDPs from the above mentioned communities, displaced as a result of insecurity created by the insurgency of Boko Haram. At the time of the research, statistics made available by the camp's management indicated that the Bakassi IDP camp hosted 39,176 IDPs among which 8578 were men, 11,327 were women, 9057 were boys and 10,124 were girls. IDPs from Guzamala, Gwoza, Marte, Monguno and Nganzai were selected as interviewees because they came from the area of interest near Lake Chad. The community interviewed in Maiduguri was the closest to the Bakassi IDP camp.



**Figure 1.** Map of the study area near Maiduguri and the five rural government areas (LGAs). (Source: Blessing Fabeku for the authors).

It was unsafe for the research team to travel to the communities shown in Figure 1 (besides Maiduguri). Instead, information about these communities was provided by interviews with members from these communities conducted in the Bakassi IDP camp.

### 2.3. Data Collection

A total of 304 respondents (204 in the Bakassi IDP camp and 100 in the host community in Maiduguri) were interviewed between March 2019 and May 2019. The research phase was limited to this period due to the high level of insecurity in the region.

Questions were aimed at understanding the sources of water used in the various communities, and whether or not community members had intentions to migrate in cases of water scarcity. For the host community in Maiduguri, questions were related to water availability in the community, their previous migration history in relation to water scarcity and past conflicts as well as their opinions on the presence of IDPs in their community. Questions related to water availability did not aim at quantifying water scarcity in terms of duration or severity because respondents tend to have problems remembering these specific details and the data become less reliable and comparable (see [42]). Instead, respondents were asked to compare the amount of water available to them with their water needs for agriculture purposes and household use. Some of the respondents did not speak English therefore a member of the research team translated from Kanuri or Hausa to English. Respondents were randomly chosen among members of each local community. Table 2 shows the gender and main livelihood activity of the respondents.

**Table 2.** Gender and main livelihood activities of the respondents for each community.

Community	Number of Respondents	Males	Females	Farming	Business and Other Activities
Guzamala	38	52.60%	47.4%	94.74%	18.42%
Gwoza	60	15%	85%	76.67%	45%
Maiduguri	100	70%	30%	50%	50%
Marte	43	53.50%	46.50%	90.70%	44.19%
Monguno	41	48.80%	51.20%	82.92%	34.15%
Nganzai	22	27.30%	72.70%	86.36%	31.81%

The respondents were asked for their main livelihood activities which means they were allowed to mention more than one. Hence the totals can add up to more than 100%.

Researchers and experts from various institutions in Abuja were also interviewed. They were from the federal ministry of water resources, the Federal Ministry of Environment, the National Commission for Refugees, Migrants and Internally Displaced Persons, and the Institute of Peace and Conflict Resolution. Questions were asked about their views, knowledge and expertise on water access, water-related migration and violence in northeast Nigeria. Interviews were recorded, transcribed and analyzed using the MaxQDA software package.

### 2.4. Data Analysis

Results of interviews conducted in the Bakassi IDP camp were analyzed by means of inferential statistics. More precisely, the association between the intention to migrate in cases of water scarcity and other variables including source of water (groundwater or surface water), previous water scarcity, previous migration and type of activity (farming or not) was tested by performing a chi-square test of association using the IBM SPSS Statistics software package. The chi-square test of association tests whether there is a significant association between the intention to migrate expressed by members of each community and the variables named above. For the  $p$ -value set at 0.05, a statistically significant result ( $p \leq 0.05$ ) means that there is a significant association between the intention to migrate and the tested variable. Otherwise, the association is not significant.

To assess the potential of conflict between IDPs and the host community, members of the host community were asked if they were in favor of the presence of IDPs in their

community. The association between the opinion of the host community members on the presence of IDPs in the community (whether they agreed or not) with variables related to resources and conflict was tested also using a chi-square test of association. Such variables included previous conflict, previous migration, the perceived fear of land being taken by IDPs, and the history of previous water scarcity in the host community.

### 3. Results

#### 3.1. Statistical Results

A large majority of respondents from Guzamala, Gwoza, Marte, Monguno and Nganzai indicated that they would migrate if they experienced water scarcity. In Guzamala, 97% of respondents affirmed an intention to migrate, followed by 90% in Gwoza, 46.5% in Marte, 93% in Monguno and 82% in Nganzai. When the association between the intention to migrate and water related variables (groundwater access, surface water access, previous water scarcity, previous migration and farming) was tested using a chi-square test of association, the following results were found.

In Guzamala, Gwoza and Nganzai, none of the tests of association were statistically significant. This suggests that the intention to migrate expressed by members of these communities was not dependent on any of the variables related to water access or water use. In Guzamala and Nganzai, no association was found between the intention to migrate and access to surface water or access to groundwater. This is likely due to the fact that all respondents in Guzamala and Nganzai indicated having access to groundwater only.

In Marte, statistically significant results were found in the association between the intention to migrate and the practice of farming ( $p = 0.01$ ), and between the intention to migrate and the history of previous migration ( $p = 0.05$ ). Statistical results in this case indicate that a higher proportion of those who practiced farming were willing to migrate in cases of water scarcity, while those who did not practice farming mostly indicated that they would stay regardless of water availability. Furthermore, mostly those who migrated before in response to water scarcity expressed intentions to migrate in the future, while those who never migrated before in response to water scarcity were not willing to migrate for the same reason in the future. In Monguno, a statistically significant result was found between the intention to migrate and access to surface water ( $p = 0.05$ ). In this case, respondents who did not have access to surface water were more willing to migrate in cases of water scarcity in the future. All other tests in Marte and Monguno returned no significant results. Table 3 is an excerpt of the output of the chi-square test of association showing as an example, the association between the intention to migrate and the respondents who practiced farming in Marte.

**Table 3.** Output test from SPSS for the association between the intention to migrate and the respondents who practiced farming in Marte.

Variable	Value	df	Asymptotic Significance (2-Sided)	Exact Sig. (2-Sided)	Exact Sig. (1-Sided)
Pearson Chi-Square	6.508 <sup>a</sup>	1	0.011		
Continuity Correction <sup>b</sup>	4.974	1	0.026		
Likelihood Ratio	6.869	1	0.009		
Fisher's Exact Test				0.023	0.012
Linear-by-Linear Association	6.357	1	0.012		
N of Valid Cases	43				

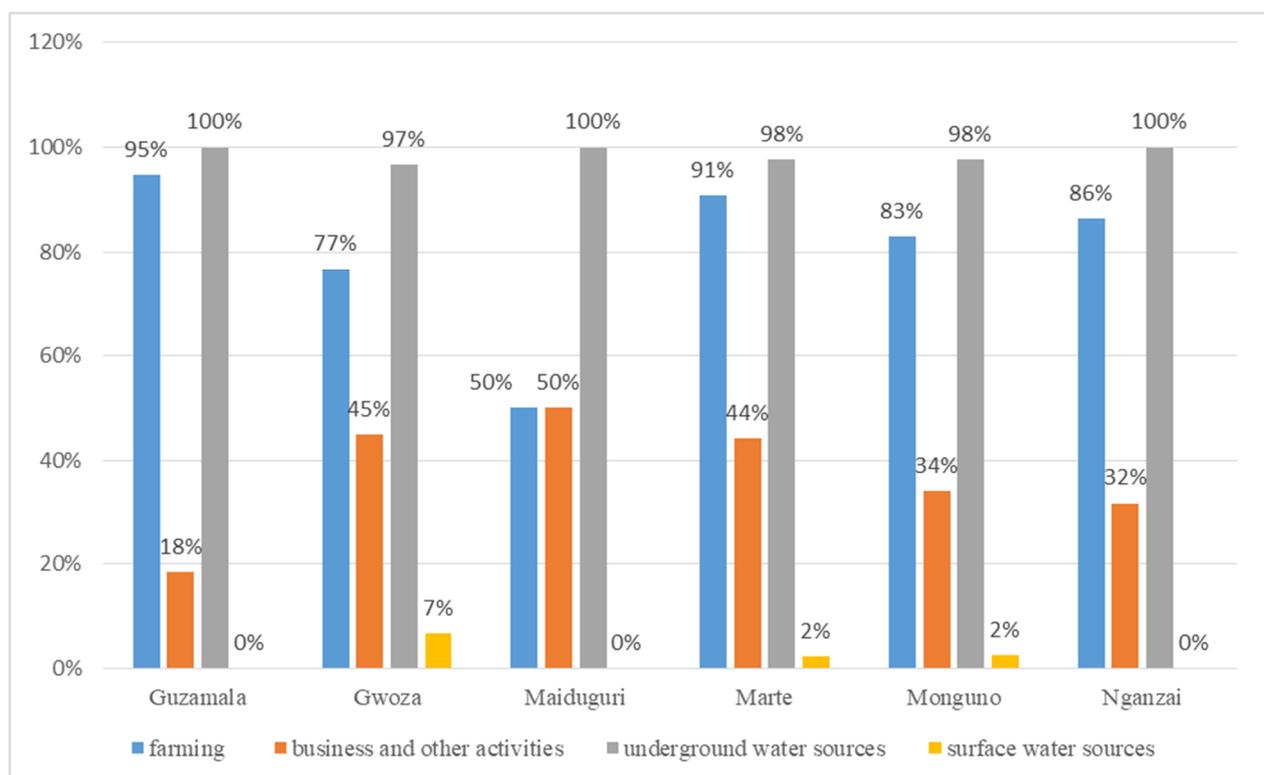
<sup>a</sup> 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.98. <sup>b</sup> Computed only for a  $2 \times 2$  table. 'Asymptotic Significance (2-sided)' for 'Pearson Chi-Square' represents the  $p$ -value. 'df' is the degree of freedom.

In the host community (Maiduguri), only 15% of respondents were in favor of the presence of IDPs in their community, while 85% of respondents did not approve the presence of IDPs in their community. A large majority of those who were opposed to the presence of IDPs in the community indicated in summary that living conditions provided

to IDPs were not enough to meet their needs, which would result in IDPs putting extra pressure on the host community's resources. Statistical tests show a statistically significant association between the respondents' opinion on the presence of IDPs in the community and those who experienced conflict in the past ( $p = 0.03$ ). Statistical results reveal that, among respondents in the host community, mostly those who never experienced conflict before were in disagreement with the current presence of IDPs in the community. The test of association between the respondents' opinion on the presence of IDPs in the community and the history of migration was also statistically significant ( $p = 0.05$ ). Here also, the statistical results revealed that respondents in the host community who never migrated before were mostly opposed to the presence of IDPs in the community. The tests of association between the respondents' opinion on the presence of IDPs and the history of water scarcity in the host community, as well as the test of association between the respondents' opinion and the perceived fear of land being taken by IDPs, were not statistically significant.

### 3.2. Water Availability in the Study Area

Figure 2 highlights the sources of water usage in the study area and the type of activity practiced by the respondents. The results show that members of the communities are mostly farmers and their main source of water for both agriculture and household use is groundwater. Surface water availability, mostly from seasonal rivers, is very low across the study area, and even absent in two of the rural communities (Figure 2). The results also show that in addition to agriculture, many of the respondents in the study area practiced multiple activities such as small businesses or manual activities (e.g., tailoring).



**Figure 2.** Main livelihood activities and sources of water used in the study area. The respondents from the host community in Maiduguri and IDPs from the five rural communities were asked to define for their main livelihood activities and water uses which means they were allowed to mention more than one. Hence the totals can add up to more than 100%.

Maiduguri was the community where most respondent (47%) reported having experienced water scarcity at least once in the past. Besides residents from Maiduguri who all reported having access to deep boreholes with pumping devices installed in their commu-

nity, 27% of the respondents from all other communities combined reported making use of shallow (hand-dug) wells to access groundwater. The remaining respondents reported accessing groundwater by means of constructed boreholes.

To get an alternative picture of the state of water resources in the region, subject-matter experts were also interviewed. A water expert interviewed in the Federal Ministry of Water Resources in Abuja points out the population's pressure as a potential cause of water scarcity in the region and in Nigeria as a whole. He said: 'one of the main issues that Nigeria as a whole faces in terms of water and environmental resources management is population pressure. Due to the high population of the country, too much is being taken from the environment without giving it enough time to rejuvenate'.

The above statement indicates that the continuous exploitation of groundwater in northern Nigeria coupled with the rapid population growth and the low rainfall may affect the availability of surface and groundwater in the region. A study by Tukur et al. [4] revealed a decrease in groundwater level in northern Nigeria between 2010 and 2013. The same study also found that groundwater beneath the floodplain in the Chad formation of northern Nigeria dropped from 9000 Million Cubic Meters in 1964 to 5000 Million Cubic Meters in 1987. The Nigerian population is currently estimated at 201 million and may reach 295 million in 2035 [43], suggesting even more pressure to come on groundwater resources as the population continues to grow.

### 3.3. Water and History of Migration in the Rural Communities

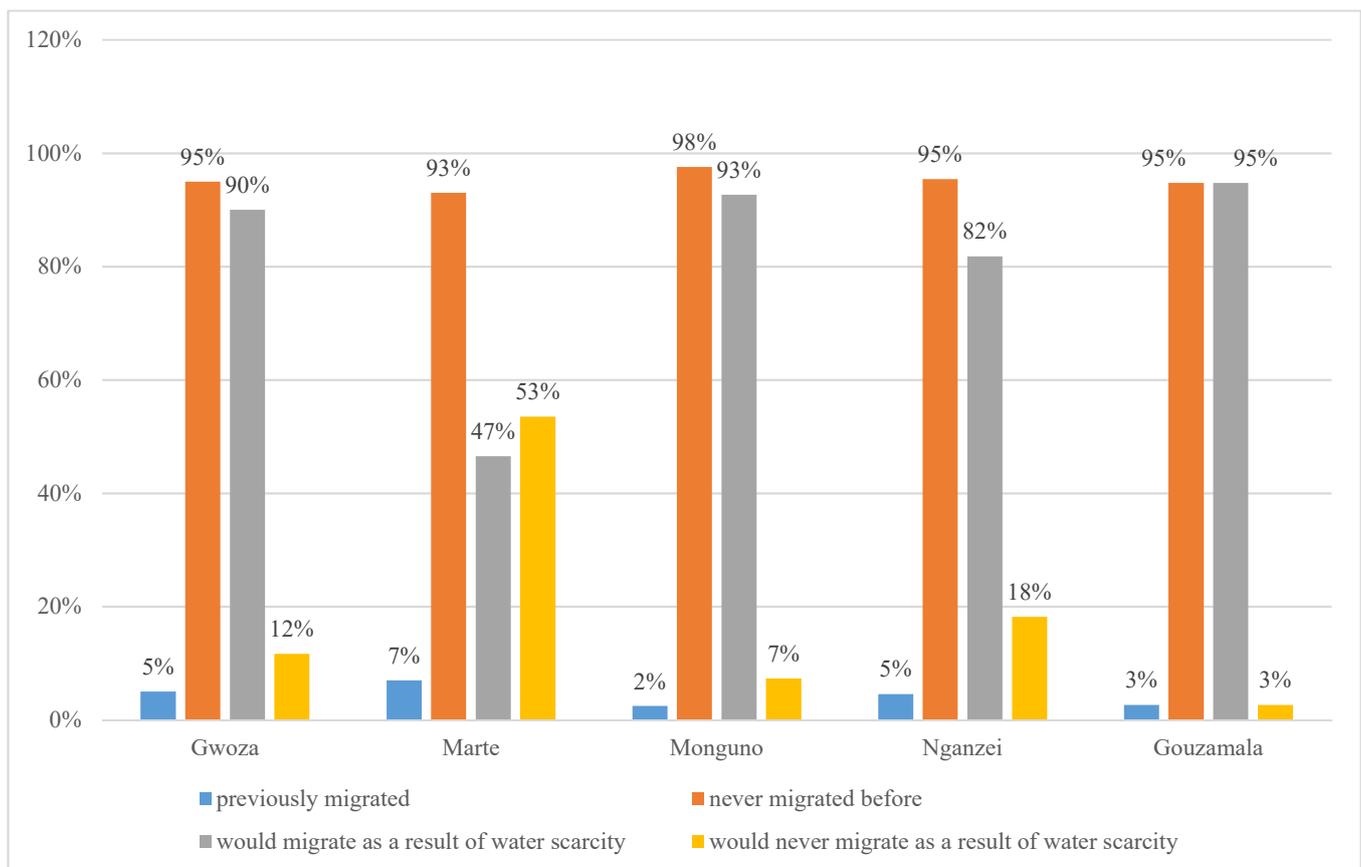
Results presented in Figure 3 provide information on the history of water related migration with respect to IDPs' communities of original residence. While between 2.6% and 14% of the respondents indicated to have experienced water scarcity in the past years, the proportions of those who migrated in response were slightly lower. Results indicate that 1% to 7% of respondents in the rural communities migrated in the past in response to water scarcity. Most of those who migrated before indicated that they moved closer to the Lake Chad, to neighboring communities or to the urban center but returned when the situation was back to normal. A 60 year old woman from Nganzai said: 'we experienced water scarcity before, we moved to Maiduguri and returned two years later'.

Furthermore, a 41-year-old man from Monguno stated that: "fires destroyed all our land 25 years ago, also rendering water sources unusable. We then migrated to another village and returned some years later".

The largest number of respondents had never migrated previously (i.e., before their present migration event due to conflict) despite water scarcity or land desertification and mostly indicated that they walked long distances every day to get water from other villages or used more sophisticated tools to extract groundwater. This is the case of a 37 year old man from Monguno who stated that: 'whenever we experience water shortage, we use motorized generators to pump water from deeper inside the ground'.

When asked if they were intending to migrate in the future in case they face water scarcity, a large majority responded affirmatively, between 47% and 95%. The rest of the respondents indicated that they would never migrate from their communities regardless of how harsh water scarcity or land desertification could get. Figure 3 compares vulnerability to water scarcity, represented by the intention to migrate in the rural communities.

Data presented in Figure 3 reflects the status of the IDPs in their communities of origin before they were displaced by the conflict. Therefore 'previously migrated' indicates those who migrated in the past in response to water scarcity; 'never migrated before' indicates those who have never migrated in the past in response to water scarcity; 'would migrate as a result of water scarcity' indicates those who said they would migrate from their community of origin if they experienced water scarcity and 'would never migrate as a result of water scarcity' indicates those who said they would never migrate in their community of origin if they experienced water scarcity.



**Figure 3.** Comparing vulnerability to water scarcity in the communities of the study area.

#### 4. Discussion

Results indicate that large proportions of responding IDPs from the rural communities (Guzamala, Gwoza, Marte, Monguno and Nganzei) expressed intentions to migrate in case they experienced water scarcity. In Marte, those who were willing to migrate constituted only 46.5% of respondents, while these proportions were much higher in all other rural communities (82–95%). The results of the study do not provide enough information to justify this difference observed in Marte. However, the statistical analysis showed that in Marte, unlike in other rural communities in the study area, the association between the intention to migrate and the history of previous migration, as well as the association between the intention to migrate and the practice of farming were statistically significant. Together with the previous associations, results further indicate that more of the respondents who migrated in the past in response to water scarcity were willing to migrate in the future in case they experienced water scarcity again. Additionally, more of those who practiced farming were willing to migrate in the event they experienced water scarcity.

In addition to water scarcity, many other factors may contribute to the decision to migrate. Wetlands International [44] mentions other push factors of migration in the Sahel, such as growing populations, ethnic tensions, social ostracism, and the decline of ecosystems and affiliated natural resources. Furthermore, low or absent water access increases environmental vulnerability, human insecurity, and dependence. Most crops cultivated in northern Nigeria are irrigated with groundwater [4,45–47]. While factors motivating migration are likely to be different from person to person or from community to community, additional push factors of migration as determined above may aggravate water stress.

Water related migration is often motivated by the attractiveness of water resource development or favorable environmental conditions within the destination community (see

for instance [48,49]). Rural communities in the present study are located in the proximity of Lake Chad, therefore benefitting from the Lake Chad ecosystems which support better livelihood options than most ecosystems in the Sahel region (see [50]). However, it is noted that up to 70% of rural households in Nigeria do not have access to improved water supply [51] and that Lake Chad has lost more than 90% of its water size between 1963 and 2017 with the Nigerian side of the Lake losing more water [52,53]. Furthermore, the Lake Chad region is characterized by low rainfall (less than 500 mm per year) and high evaporation (more than 2000 mm per year), resulting in excessive use of groundwater resources [54,55]. As a result, viable pasturelands, groundwater resources, and water for agro-pastoralists is strongly reduced [56].

One would expect that with water availability in such a precarious state, local populations would be prone to migrate in search of better environmental conditions. Migrants interviewed in the Bakassi IDP camp reported that they would migrate because of water scarcity experienced in their place of origin. When asked about the reasons why they actually migrated, water scarcity was not indicated as the main push factor. A study by Kamta et al. [57] also found that migration from rural areas of northeast Nigeria to IDP camps in Maiduguri happened mainly as a result of the insecurity created by the insurgency of the Boko Haram group and the counter-insurgency by the government. The time of migration or the time people spent in conflict before migrating differed from community to community and was a function of environmental and socioeconomic factors. Linked to the present study, is it safe to assume that water scarcity may act as a push factor of migration when aggravating factors such as insecurity are present.

Contrary to the high intention to migrate in cases of water scarcity expressed by respondents from the rural communities in the current study, only a small proportion of them actually migrated in the past in response to water scarcity (7% in Marte, 5% in Gwoza, 4.5% in Nganzai, 2.5% in Monguno and in Guzamala), indicating that conflict related insecurity was a much more dominant factor in forced displacement. Most of those who migrated before said they moved to a nearby community or to the city (Maiduguri) and returned after a few years. Therefore, migration caused by water scarcity in this region can be seen as circular with an aim to allow local communities to adapt to water shortages. However, as suggested above and confirmed by Kamta et al. [57], poor socioeconomic and environmental conditions including water scarcity in the study area create vulnerability and the people are more prone to migrate when aggravating factors such as conflict and insecurity are present (see also [58]). Therefore, the decision to return to the home community is not only dependent on the availability of water, but to a significant degree on the resolution of the conflict and the presence of safe living conditions in tandem.

This also applies to the relationship between migrants and host communities. Long term settlement of displaced persons need to envisage the resulting impacts on social cohesion in the host community. The present study assessed the attitude of the host community towards IDPs and the potential of tensions between both groups in Maiduguri. The analysis of the data collected in the host community in Maiduguri reveals that 15% of respondents were in favor of the presence of IDPs in their community, while 85% of them were opposed to the presence of the IDPs. Furthermore, the results reveal that the association between the respondents' opinion on the presence of IDPs in the community and the history of migration within members of the host community was statistically significant. Members of the host community who never migrated before were more opposed to the presence of IDPs in their community. A similar result was found in the association between the respondents' opinion and the history of conflict within the host community, with more of those who never experienced conflict being opposed to the presence of IDPs in the community. If we admit that those who never experienced conflict before are more intimidated by the idea of a possible conflict, this result may suggest that members of the host community consider that the presence of IDPs in the community may present serious safety threats.

The pressure which the IDPs have exerted on the limited existing social infrastructures in the host communities has been identified as one of the major challenges related to IDP migration in northeast Nigerian cities [59]. Rejection of the IDPs expressed by host community members is also manifest in the nature and quality of social treatment experienced by IDPs within their host communities. According to Itumo ([59], p. 25), IDPs are regarded as strangers by their host communities. They are exposed to severe socioeconomic challenges such as starvation, lack of accommodation, unemployment, social discrimination, sexual harassment and child abuse, resulting in serious health challenges, such as vascular diseases, malaria, malnutrition, water borne diseases and ultimately death [59]. Conditions in which IDPs find themselves in host communities of northeast Nigeria may make it more likely for IDPs to experience radicalization [59]. Furthermore, Lischer [60] notes that in some cases, groups of refugees who have experienced persecution tend to become violent. This is especially likely for long-term refugees who see no hope of return until radical change occurs in their homeland. Even though IDPs in northeast Nigeria are not classified as refugees, as they did not cross an international border, the situation in which they find themselves may be similar to that of refugees [60]. The fact that 85% of host community members were opposed to the presence of IDPs in their community does not establish a clear link between IDPs settlement and tensions with host community members, but Itumo [59] and Lischer [60] suggest that a prolonged stay of IDPs in host communities without hope to return, may lead to tensions.

Most experts interviewed in Abuja also agree that the presence of IDPs in host communities presents a security issue in those communities. Even if the relationship between IDPs and host communities seems peaceful for now, tensions may arise between the parties in the future if nothing is done to reduce the growing numbers of IDPs and to improve living conditions in IDP camps and host communities concurrently. Field experts interviewed at the National Emergency Management Agency in Abuja note a discontent of host communities in northeast Nigeria who feel that more attention is given to IDPs while members of host communities are neglected and poor, and require assistance.

## 5. Conclusions

This study provided new empirical insights into the migration–conflict–water nexus in the Lake Chad region, based on a quantitative analysis of questions addressed to internally displaced persons in the Bakassi IDP camp and residents in the Maiduguri community in northeast Nigeria, as well as an evaluation of qualitative interviews with experts. The aim was to answer the following two research questions in Northeast Nigeria: (1) What role does the access to water and farming play in out-migration and return in northeast Nigeria? (2) What is the potential of tensions between internally displaced persons (IDPs) and host communities? Six local communities were selected as case studies, including five rural communities and one urban community. Results indicate very poor access to surface water in northeast Nigeria, resulting in the extreme reliance on groundwater, accessed by means of constructed boreholes and hand-dug wells. Furthermore, results indicate that 76% to 95% of respondents from the rural communities practiced agriculture as the main source of income. In the absence of adequate quantities of water for agriculture, members of rural communities are likely to migrate in search of better environmental conditions, and return when water is available again. Among members of rural communities interviewed in the Bakassi IDP camp between 47% and 95% of them reported that they would migrate in response to water scarcity in their places of origin. Even though access to surface water is extremely low in this region and partly compensated by groundwater, less than 7% of the respondents mentioned that they migrated in the past in response to water scarcity. This suggests that water scarcity may contribute to migration in the presence of additional aggravating factors, such as insecurity and conflict, as established by Kamta et al. [57].

Lack of access to water is thus a potential push factor for migration in the Lake Chad region. Therefore, in order to reduce future migration in the region, we suggest that water resources should be managed properly. This may include the regulation of

irrigation activities and the construction of boreholes to limit groundwater depletion and pollution. The construction of dams to harvest and store water during the rainy season and the redistribution during periods of water scarcity may improve access to water. Furthermore, proper management of water resources in the region must also include an improved recharge of the aquifer. Accomplishing this requires knowledge of recharge zones for all associated aquifers in order to protect them and ensure a better recharge of the groundwater reserves.

Regarding our second research question, we find a potential for tensions between IDPs and host communities. A total of 85% of respondents in the host community were not in favor of the presence of IDPs in their community. Furthermore, most experts interviewed stated that a prolonged stay of IDPs in host communities may lead to tensions and conflicts. Experts mentioned the overstretch of resources in host communities caused by the presence of IDPs as potential causes of tensions. To minimize tensions between IDPs and their host communities, measures to improve their relations should be taken—for instance through forums which offer opportunities for positive interactions and to strengthen exchange and cooperation. Concordantly, host communities need to see their lives being improved due to the presence of the IDPs. This means that not only do the living conditions and access to basic services for IDPs need to be addressed, but also those of the host communities too. This strategy is likely to reduce potential grievances between the two groups.

Overall, the results show a complex relationship between migration, conflict and water in Nigeria. Taking the perspectives and knowledge of the local people into consideration, it becomes apparent that intentions to migrate in response to the pronounced water scarcity in the region translate into actual reasons and responses for migration in connection with other factors, such as agriculture, groundwater availability and conflict. The relationship between IDPs and residents of local communities is also relevant, which is influenced by various factors, including the availability of and competition for shared resources, which can influence perceptions and tensions between these groups. Both issues have not been well studied in the past and further research can provide insights for policies to manage water, migration and conflict and in so doing strengthen the resilience of communities in the Lake Chad region.

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