The Impact of Climate-Induced Migration on Educational Attainment Among Youths in the North Bank Region (NBR) of The Gambia

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Abstract: The North Bank Region is an agricultural region of The Gambia grappling with climate change-induced migration. This study examines the impact on the people, vis a vis youth educational attainment and migration. With primary and secondary data, The Mann–Kendall trend test and Sen's slope estimator were applied to evaluate the trend and magnitude of the climatic variables obtained from the Department of Water Resources. Household data were collected using a structured questionnaire to assess the impact of climate change on the youths, especially their educational attainment. Secondary data on school enrolment and completion rates of the region were collected from the education ministry to ascertain the trend of education from 2011 to 2021. Furthermore, the impact of climate extreme events from the questionnaire was analyzed. Finally, the effect of migration on educational attainment was assessed. The findings demonstrated that climate change has posed a burden on the people, through increased windstorms, increased rainfall, drought, and flood, which has led to crop and property damage, erosion and loss of lives among others. Irrespective of the low level of educational attainment of the area the majority of the inhabitants are conscious of the changing climate. However, only a few understand what climate change is, this is important in helping young people to appreciate and tackle the consequences of global warming. Climate change was found to impact school dropout, interruption in schooling and a reduction in the schooling years for the youths.

Keywords: Climate Change, The Gambia, Migration, North Bank Division, Education

1. Introduction

Climate change-induced disasters and environmental degradation will continue to affect migration as human mobility is significantly impacted by the changing climate (IOM, 2015). However, global population distribution and growth have been greatly influenced by climate and geography (Berlemann and Steinhardt, 2017). Climate-induced threats are ravaging nations worldwide, with poor countries being more vulnerable due to their low adaptive capacity and heavy dependence on climate-sensitive sectors such as agriculture (IPCC, 2022). The cascading effects of global warming are being felt by way of erratic and torrential rainfall leading to severe flooding in central and Eastern Africa and parts of West Africa, Europe, and the Americas. Tornados and bushfires ravage cities causing serious damage to lives and livelihoods (Alemayehu & Bewket, 2016). Drought has deprived Central, West, and Eastern African populations of necessities, particularly water for survival, making farming impossible as most crops are cultivated close to physical thresholds beyond which yields start to drop (Mueller et al., 2020). To this effect, productivity has declined, leaving many with no option for efficient survival.

The Gambia youth population increased from 489,666 to 690,836 between the censuses of 2003 and 2024 signifying a 41.1% or 3.4% increase in annual growth rate (Gambia Bureau of Statistics (GBoS) preliminary report, 2024). The Gambia Labour Force Survey (GLFS, 2018) data shows that unemployed females total 129,792 (57.1 %) while the males are 104,933 (42.9 %). Rural unemployment totals 76.6% compared to urban areas (23.4 %), and 45.3% were found to be the proportion of youth employment visa vis rural population ratio. This explains the driving force of youth migration. 44.9% of the employed youths are engaged in the manufacturing, processing, and services sectors, followed by 16.4%.

Before 1994 when the military took over power, the country had nine high schools out of which two were rural based. Also, few primary schools dotted the provinces, compelling youths to relocate to the

urban areas for educational purposes. The trend continues despite the improvements in the rural education sector as the problem of quality education persists. Due to the dwindling quality of education delivered over the years, rural students suffer. Furthermore, the country has only one public university, compelling students to migrate to receive higher education. Hence, apart from climate change, there are other forces propelling migration.

Youths in the NBR have faced a quick turnover. As farming is impaired by climate change, with limited educational and employment opportunities, and scanty social amenities, the future remains bleak. As parents have no dependable income, education becomes unaffordable. These developments compel the youths to migrate, conscious of the responsibilities they have to shoulder. Education is a family priority, hence school dropouts, for this reason, leave their families. This has necessitated this research effort which focuses on climate-induced migration and its effects on youths' educational attainment in the NBR.

This exercise will ascertain the effects of climate change on the people of NBR, examine how the climate-induced phenomena affect the educational attainment of the youths, and establish the nexus between climate extreme events and migration. The focus is on NBR, where nearly every household has produced an irregular migrant (Armitano, 2017). It has the region's highest internal migration count (GBoS, National Migration Analysis, 2013). Deportees, as well as their family members, household heads, village elders, youths, and migrants, will be considered.

Research on external migration in The Gambia is in publications but there are grey areas. Conversely, internal migration issues within the country are under-researched. This effort will link climate change impact, migration and educational attainment by providing first-hand information on how imperceptibly unrelated they are, substantiating the existing literature. This will inform policymakers on how to address the impact of climate change. Additionally, it will provide the prerequisite knowledge on why youths migrate from the NBR and how it affects educational attainment. Goal 4 of the sustainable development goals, refers to inclusive and equitable quality education and promotion of lifelong learning. This goal is aimed at reducing disparities and inequalities in education in terms of access and quality, hence, it forms part of The Gambia education policy priority. Therefore, it is paramount for the education authorities in their relentless efforts to provide quality education, to be capacitated to understand the challenges confronting the youths.

The realities of climate change are evident but to what extent it affects youth education remains downplayed. It is a key player in losing school contact time, interrupting schooling, and dropping out. As extreme weather events aggravate during the rainy season, heavy rainfall leads to flooding and inundation of school grounds, making schools inaccessible to students, and/or washing away homes, leaving people with no choice but to seek shelter in school buildings, resulting in interruptions. Wind storms have similar consequences on schools and schooling, making climate change impacts pivotal in this study.

1.1. Statement of the problem

The research provides insight into how climate-induced migration affects the educational attainment of youths, its effects on lives and how youth migration affects educational attainment. Climate change and socioeconomic challenges such as high youth unemployment rates and poor national development are responsible for youth migration in many African countries. The undesirable impact of climate change on agricultural production is glaring (Adhikari et al., 2022). In the population and house survey data 2013, NBR registered 8.1% unemployment rates. However, with its limited job opportunities, it is obvious that most of the populace engages in farming. It has been highlighted by the National Population Census (2024), that, the activities engaged in by the people of NBR are: crop farming (56.1%), livestock rearing (25.1%), fishing (17.5%), hunting (1.6%), poultry (3.2%) and horticulture (2.0%).

Gambian farmers engage in subsistence rain-fed farming using traditional implements, 75% of which rely on crops and livestock for their livelihood. However, the rainy season lasts for barely six months, and for the rest of the year, farmers either migrate to urban centres looking for jobs or remain idle. Irregular total annual rainfall is transforming the population distribution; as the populace has progressively become more complex and organized while it responds to manifestations of climate-induced environmental change. Hence, with the advent of the effects of climate change and the lawless state of Libya, most NBR youths set off to Europe. According to Gibril Faal, (2000), between 2014 and 2019, Gambians numbering 40,000 entered Europe through irregular routes.

Furthermore, the frequency and intensity of extreme weather events such as wind storms, have increased. In September 2021, a storm measuring 85km/hour, followed by heavy precipitation, caused substantial losses to lives and properties throughout The Gambia, with an estimated number of 100 communities and more than 16,849 people displaced (National Disaster Management Agency, 2020). Hence, migration and climate change are positively correlated. Nguyen and Sean (2021), state that rural residents are likely to migrate/relocate to urban areas in response to the impacts of climate change, nevertheless, the majority of medium and small-holder farmer families registered the highest migration rates. Migration is an alternate solution for farmers/their household members to sustain their livelihoods, (Nguyen & Sean, 2021). It is an adaptation tool in the face of climate change. NBR registered (16.3%) unemployed youth, which ranges among the highest in the country, (population and housing census, 2013). Following the past three population and housing censuses, NBR recorded an outmigration of 22.1% and 33% between 1993 and 2013.

Furthermore, as migration spikes, youths took to illegal routes for lack of travel documents. This defines an overland journey from The Gambia via the Sahara/Mediterranean to Europe (IOM 2022).

Findings by IOM (2022), show that 5 years before the study, 61,515 people emigrated, and of this, 62.6% used irregular routes further elaborated that, among the emigrants, 13,478 had upper secondary education, while 10,147 had no formal education. This has been corroborated by the National Development Plan (NDP) 2018-2021, claiming the population of migrants has reached 200,000.

Research has been undertaken on various aspects of climate-induced migration and educational attainment, but none has three elements combined. Resosudarmo and Suryadarma, (2014) examined the impact of childhood migration on educational attainment; evidenced by rural-urban migration in Indonesia, Allgood and Kareen, (2016), studied climate-induced migration: exploring local perspective in Kiribati, while Muller, Gray and Hopping (2020) studied climate-induced migration and unemploymentin middle-income Africa, Bhatta D., Aggarwal K., and Belgrave A., (2015), only looked at climate-induced migration in South Asia: looking at migration decision and gender dimensions of adverse climatic events. This evidence, coupled with the never-ending rise in youth numbers from the NBR abandoning their education and taking to irregular migration, and the impact on their lives and their relatives necessitated this research. The sheer number of youths who lost their lives during these voyages has left families devastated. To make sense of the numbers, a town in Italy is unofficially named after a village in NBR (Njaba-Kunda), due to the number of youths from the village that have relocated to Italy. Apart from the deaths, education has suffered setbacks due to the numbers dropping out of school. Besides, education standards in the NBR are not at par with those of the urban areas.

Notably, the impact of climate is getting worse by the day. Youths are vital for the development and sustenance of communities, but for the NBR, only women and the elderly are in large numbers. Agriculture has declined, and the forest cover has been depleted due to climate and anthropogenic factors, resulting in a reduction in crop yield.

1.2. Study scope and significance

The object of the study is to assess climate change and extreme climate event's impact on the educational attainment of youths vis-a-vis migration in the NBR. Global adaptation efforts are hampered by the effects of climate change and The Gambia is not an exception to the vulnerability. This study aims to understand how climate-induced migration has impacted young people's scholarly achievement in the NBR. An IOM report (2013) shows that the region has the highest number of youths taking to irregular migration. Consequently, this study examines why they migrate.

The NBR is vulnerable due to its strategic importance and location. It is on the lower reaches of the Gambia River where it discharges into the Atlantic and serves as a gathering and departure point for youths. As a fishing community, it holds the necessary components for the expedition, such as boats and enthusiastic sailors. The research adopted a mixed-methods approach which combines primary and secondary data. Focus group talks with key informants from the sampled community using a set of structured and semi-structured questions Households were selected at random, while migrants and deportees were purposefully selected. The exodus has generated interest that it needs a concerted effort from the government, stakeholders and individuals to overcome. Climate variability has impacted agricultural productivity as it is the most important determinant of agricultural activity from the perspective of geographical coverage (Randell & Gray 2016). The Gambia population housing census data for the past 30 years (1993, 2003 and 2013) indicates that there is a population increase, causing a surge of internal migration (GBOS, National Migration Analysis, 2013). Most of the youthful population with 37.2 % between the ages of 13 and 30, (population and housing census data, 2013) are employed (44.9 %) in the agriculture, hunting, fishing and forestry industries.

The study revealed the impacts of climate change, the degree of environmental awareness and the extreme weather events. It established that both rainfall, and maximum and minimum temperatures trends are increasing, but the rainy season is shortened. Equally, it highlighted the trend of education in the NBR. The higher the grades students attain vis-a-vis dropout rate are proportional. It further shows that climate-extreme events negatively impacted youth education through reduced contact time. Lastly, it shows the educational attainments of the youths reflect the push and pull factors in the area.

2. Theoretical Review

Migration is as old as man as people relocate in search of food and safety. The phenomenon has been reinforced by urbanisation and economic divergence. In The Gambia, the late 80s and early 90s witnessed an era of minimal to no travel restrictions, but it did not entice the youths to migrate. However, the exodus escalated in the early 1990s. Novel viewpoints emanating from human geography, cultural studies and qualitative sociology have influenced investigation into some aspects of migration theorization (Langley, Vanore & Rango, 2016). Besides the prominent effects of climate change, it bothers security while others took a protection approach, yet others depicted migration as an adaptation/climate risk management strategy, due to the nexus between climate change and migration has progressed in policy circles, academic, and advocacy, (Vanhala & Calliari, 2022). Nevertheless, addressing the Gambian problem with a comprehensive migration theory will be arduous. Hence, the following theories are examined to decipher the causes.

2.1. The neo-classical economic theory

It explains individual decisions to maximise income in environments characterised by wage disparities, "a theory that terms migrants as rational agents in pursuit of more dignified life opportunities" (Rajendra, 2014; Douglass, et al., 1993) believe that the structural requirements of modern industrial economics are what concerns the neo-classical theory while the new economics sees it from the point of view of globalization and market penetration across international boundaries. Ostensibly, the Gambian situation fits both points of view. According to the theory, migrants are motivated by the difference in

wages and employment opportunities at the destination country, this concurs with the push factors of Gambian migrants.

2.2. The network theory

The concept explains why organisational structures and practices become entrenched, and how and why change occurs, (Henrich R. Greve & Linda Argote, n.d.), It reflects on the processes by which norms, rules, schemas and routines, become reputable as authoritative guidelines for social behaviour (Scott, n.d.), etc. However, these perspectives neglected the micro-level situations underpinning the Gambian condition. Hence, the underlining implicit prepositions and assumptions of the neo-classical macro and micro theories outlined in Douglass, et al., (1993), and other theories, do not perfectly apply to The Gambia yet, ostensibly outward labour movement seems to be responding to the forces of demand and supply and wage differentials. This shows that there is a chasm between theory and practice in understanding the Gambian case.

Douglass, et al, (436) postulate that the new economics of migration posits that broader entities related to individuals, particularly family, decide on migration issues. This partly applies to The Gambia, as families dispose of assets to foot migration costs. contrarily, youths surreptitiously migrate without informing family members by self-financing trips through saving, selling family assets, or borrowing.

In developed economies public programs cushion the effects of risks to household incomes. Gambians reasoned that migration is an incentive to diversify risks. Superficially the reasoning seems logical, but intrinsically defective. In advanced societies, "price risk for agricultural produce is managed through future markets that allow farmers to sell all or part of their crop for future delivery at a guaranteed price." However, The Gambia commodity marketing board inherited from the colonial administrators deteriorated for several reasons.

2.3. Dual market theory

It hinged on "the fact that international migration was born from the fundamental labour demands of present-day industrial societies." Superficially, it harmonizes with the Gambian situation considering the destination choices of migrants. Nevertheless, the exponential rise in the migration trend is unrelated to labour demands in Europe and "the disjuncture in living standards between" the two worlds. Therefore, other forces ignited the exodus.

Analysis of habeas corpus suspensions in India (1975-77), Brazil (1964-69), Israel (1945), and Germany (1878-90) will link the prevalence of a silent state of emergency in The Gambia to the phenomenal rise in migration. Others include France (1849; 1871-1876), Russia (1881), Ireland (1916), and Latin American states. It is atypical for a state to preserve the unabridged enforcement of peacetime constitutional rights in abnormal situations. Hence, investigating population relocation models in Spanish Cuba (1893), The Philippines (1900-02), the South African Boar War (1899-01), Crimea Tatars (1860-61; 1944) the Armenian (Ottoman) WWI incidence will reinforce the hypothesis that the Gambian case transcends classical and neo-classical theories. An exemption to this rule looks as if the new economics of labour migration (Stark, 1978, 1991), conceptualize migration within the context of relative poverty and constraints as a household's co-insurance strategy aimed at varying income via risk-spreading. Individualistic optimization decisions are expected, from a protagonist's perspective, to impart to a more optimum allocation of production factors at the macro level. This is expected to reduce economic gaps between origin and destination areas. It involves the transfer of labour from poor areas to rich countries and a reverse flow of capital from rich to poor areas (Haas, 2010).

2.4. Human capital theory

Becker's (1966) human capital theory emphasises the relationship between education and economic gains. According to MacKenzie and Chiang (2021), individuals acquire greater problem-solving skills as

they become educated, enhancing their employability, productivity and earning prospects. The theory has been broadly applied in the economics of education, but it is challenged when applied to international migrants (Matache, 2023). Studies established that migrants are disadvantaged in the job markets of host countries, not only because of their attributed human capital but the depreciation of their capital when they migrate to other countries (Karalis Noel & Finocchio, 2022). This makes qualified individuals, after migrating, do menial jobs they despised in their home countries. The educational credentials of migrants may not be at par with those acquired in the host country, making them untransferable (Teixeira, 2014). However, the concept contradicts the situation where an unschooled migrant makes more gains than the so-called educated. In The Gambia, education can be the answer to the economic success of an individual, but looking at the education system, one cannot conclude that all who succeed economically have a good education.

2.5. Social network theory

The social network theory postulates that people's social relationships form a network where they assist each other in achieving goals. According to Riordan (2000), the theory stems from social comparison theory, which believes that people can adjust their attitudes and conducts through social reference evaluations to gain peer reception, and self-identity and achieve the legality of group survival. It further accepts that social networks inspire individual qualities and actions and in most cases, relationships are more important than the actors themselves in explaining behaviour (Weir & Ali, 2024a). Blumenschein and Hannisdal, (2024) suggest that emphasis is on the relationships and ties between individuals within a network, the nature and quality of the relationship's determinants of its usefulness to the individuals involved, and the interconnections between members of the network are measured by the level of cohesion (Burt, 1999). Castles et al (2005), asserted that this reduces the emotional and financial cost and increases the refuge of migration. An example of this theory is the case of the Gambian *Aku* ethnic group that has migrated without much difficulty, because of relatives they have abroad who assisted them with documents, abode and work. The same sentiments were corroborated by (Weir and Ali, 2024b), saying this network can help facilitate people in the job market and ease their way into a new society.

2.6. The push and pull theory

This is a Neo-classic migration theory understanding migration to be dependent on income and the possibility of gaps between origin and destination areas (Rizvi et al., 2011). This confirms that 'demographic, economic, cultural, social and environmental factors influence human capital both at origin and destination countries and the primary explanation for international migration discovered in the theoretical and the empirical literature deviates from the wage differential (Espíndola, Silveira & Penna, 2006).

Lee identified the factors related to the decision of migrants to travel as factors associated with the place of origin, destination, intervening, and personal factors (1966). Push factors are found at the point of origin and they act to propel out-migration while, pull factors are present at receiving levels (Langley, Vanore & Rango, (2016). Push factors inspire individuals to depart from their origin, while pull factors lure. Both factors can include economic, social, climatic, political, religious, and cultural issues. This theory is interpreted by economists who have interpreted migration as after the differences in economic opportunities and from anticipated wage differentials between origin and destination countries, (Falco, Galeotti & Olper, 2019). Therefore, the theory harmonises with the Gambian situation where youth migrate due to either of the reasons. The processes and diversification of migration types make it difficult to envision an overarching theory (Rizvi et al., 2011), nonetheless,

this research is anchored on Lee's push-pull theory.

3. Existing Gap in Literature

Climate change impact dissects all aspects of human life, triggering pieces of research. This study focuses on the impacts of climate-induced migration and the educational attainment of youths in the NBR. Migration causes and extreme climate events have been studied extensively (Hatton & Williamson, 2002). Gambian research on the trajectories of climate-induced migration is limited. Hence, little is known about education attainment and outmigration caused by climate change. Considerable gap on the issue exists. Notwithstanding the growing public interest, quantitative literature on climate change, climate-induced migration and their effects, is still in its infancy, (Cai et al., 2016a).

4. Research Design

Research design is the "Glue" that holds all the pieces of research together, (Islamia, 2016). It is defined as the plan, structure, strategy and investigation set to obtain explorable questions and regulatory variance (Hossain, 2022). Therefore, the design relies on population size. Selected sample sizes should be representatively significant to the population for a valid conclusion. Consequently, the larger the sample size, the better the result.

The study hinges on the Push-Pull theory of migration, which postulates that push factors are found at places of origin while the Pull factors are at destination points (Langley, Vanore & Rango, 2016). The study used a mixed-method approach combining quantitative and qualitative data sought from primary and secondary sources. The former was sourced from structured, and semi-structured interviews, focus group discussions and key informant interviews which corroborates the research of (Libasse Sow et al., 2018), where they sought information on farmers' awareness, sources of climate change information and adaptation strategies (Libasse Sow et al., 2018). Interviews using a survey were the primary source of information, where semi-structured questionnaires were administered to sampled households. A multi-stage sampling technique was used. The region was purposively selected out of the five regions of the country, using available data on migration for the region, it has been confirmed that the NBR is among the largest migrant centres in The Gambia (GBoS, Preliminary Report, 2024). An inclusion/exclusion criterion was applied to identify communities to be included in the sampling, thereby eliminating communities with a population of less than 50 households. Simple Random sampling was used to select the sampled communities, and a total of 30 were selected from all six districts of NBR. Sampling proportionate to size was used to determine the number of households for the study, using the total number of houses in each district and the total sample size. Furthermore, probability systematic sampling was used at the village level to select households. Secondary data on rainfall, temperature, humidity and wind data were obtained from The Gambia Water Resources Department. Students' enrolment and completion rates data for the region were supplied by the education ministry. To determine the sample size for the study, Yamane, 2003 or Slovin formula was used, hence a sample size of 400 was reached.

4.1. Study area

The Gambia, a narrow strip of land flanking both banks of the River Gambia, lies between Latitude 13°00' and 13°50' N and Longitude 16°50' and 13°45' W., bordered by Senegal, with a coastline extending 80 kilometres along the Atlantic. The country spans 11,295 square kilometres, including 1,295 square kilometres of water bodies. River Gambia, (main natural feature), originating from the Fouta Jallon Highlands in Guinea, flows across the country before discharging into an estuary. Only 13.7% of its vast 77,054 square-kilometre catchment area lies within Gambian borders. The climate is seasonal, marked by a lengthy dry season from November to May, followed by a short, intense wet season from June to October. Rainfall varies regionally, ranging from 1,100 millimetres annually in the southwest to 700 millimetres in the northeast. Administratively, The Gambia is structured into Banjul City Council and

regions: Kanifing Municipal Council, West Coast, Lower River, Central River, Upper River, and NBR. The river physically divides the country into northern and southern halves.

The NBR is subdivided into six districts, with Upper Baddibu being the largest and most populous. Farafenni serves as the division's principal town. According to the 2013 and 2024 population censuses, the total population increased from 221,054 to 248,475 people within its 2,255 square kilometres. The region's literacy rate, measured at 59.8% during recent censuses, reflects ongoing efforts to enhance educational access and quality, though slightly below the national average. The region's subtropical climate supports subsistence agriculture. However, dependence on agriculture for livelihood faced the impacts of climate change, notably the Sahara Desert encroachment, impacting land fertility and farming practices. To determine how climate-induced migration affects the educational attainment of youths, the study targets entire households within the towns and villages of its six districts as the sampling units. A representative sample of households was selected from the region, as total household coverage is impracticable.

4.2. Sampling technique and sample size

The study employed a multi-stage sampling method to determine the sample size. First, purposive sampling was used to select the NBR, as data has shown that this region has the second-highest rate of youth illegal migration (Armitano, 2017) and the highest figures of out-migration (Population and Housing Census Data, 2013). Secondly, simple random sampling techniques were used to select the 30 communities. Thirdly, sampling proportionate to size (PPs) was used to select 400 households from the region. Finally, systematic random sampling of (k=1) was used for the selection of households to be interviewed. Two enumerators conducted interviews for each community; hence, one took households on his left and the other on his right and the second compound was selected after the count of one (k=1).

Sample Size Determination

To determine the appropriate sample size, the (Yamane, 2003) formula was used: $n = N/1 + Ne^2$ (1)

where n= is the sample size of the study (region),

N = total population and

E = is the marginal eror.

The error term used in this study is 0.05 to ensure that 95% of the result is valid. The total population size is 267,043 (Bureau of Statistics, 2021). Thus, using Equation 1, a total sample size of 400 households was obtained. However, it is noteworthy that a sampling error of 15 households was made. To obtain the number of communities, a criterion was set: that is communities with less than 50 households were excluded from the sampling because such communities were insufficient to provide needed data. Hence, a Random sampling technique was used to select the 30 communities. Furthermore, sampling proportionate to sample size (PPS), where the probability of selecting a unit is proportional to its sample size, was used to select the number of households in the randomly selected communities. The PPS formula used was:

$Sc = (Hc/Hd) * S$... (2)

where Hc= total number of households per community Hd= total number of households per district

S= total sample size for the study

Using Equation 2 above, the following households were selected in each district, see Table 1 below.

Table 1

Distribution of Sample Size

District	Total households in each District	Total Number of communities in each District	Number of communities in each District	Number of Sampled households in each District
Lower Niumi	84088	70	8	130
Upper Niumi	42210	51	5	54
Jokadu	30694	40	4	40
Lower Badibu	20797	26	3	32
Central Badibu	26356	34	4	36
Illiasa	62898	61	6	108
Total	267043	282	30	400

4.3. Distribution of sample size per settlement

Table 2

Distribution of Sampled Communities and Households for the Study (A)

No.	Sampled Communities	Sampled number of households
	Illiasa	**108**
1	Jumangsarr Ba	23
2	No-Kunda	18
3	Macca Farafenni	10
4	Konteh Kunda Sukoto	26
5	Illiassa	12
6	Gikimarr	19
	Central Badibu	**36**
7	Nawleru	9
14	Wellingara Njugareh	10
15	Chesey Majaw	8
16	Jamagen	12
17	Bali Mandinka	10

Data collection started with a pre-test involving 10% of the sample size, equating to 40 interviews conducted by two enumerators who were indigenes of the NBR. Final data, encompassing both quantitative and qualitative data, were generated across 30 communities (Table 3).

Table 3

Distribution of Sampled Communities and Households for the Study

No	Sampled Communities	Sampled number of households
	Upper Niumi	**54**
18	Bakalarr	10
19	Sika	15
20	Kerr Mama	10
21	Aljamdou	8
22	Pakau Saloum	11
	Lower Niumi	**130**
23	Ndungu Kebbeh	12
24	Missiranding	20
25	Lowen	21
26	Samba Kala	14
27	Kerr Sanyang	15
28	Macca Bala Manneh	14
29	Essau	20
30	Wellingara Lewna	14

The research assistants, underwent briefing to plan the division of communities among themselves. Following the briefing, each was assigned household interviews. The method adopted ensured rigour and research integrity. The household head was the target of the interview. However, some of their absence necessitated their replacement with any family member aged 18 years or older. Questionnaires were administered in person.

4.4. Data sources

The structured and unstructured questionnaires used to recognise how climate-induced migration impacts the educational attainment of youths were in sections, with the research objectives, features of interviewees, and data gathering method spelt out. In one-to-one conversations, the interviews were conducted in local languages. Furthermore, a total of 30 key informants were interviewed for the study, one in each settlement. Youth returnees attempted backway users, others who have migrated were the focus of these questions and individuals with significant knowledge of the environment concerning climate change.

The data used for the assessment of climate change's impact on education and the effect of migration on educational attainment were obtained from primary and secondary data generated from the administration of the questionnaire to household heads. School gross enrolment and completion rates data determined enrolment and school dropout rates. Secondary data on enrolment and completion rates were obtained from the annual Yearbook of the education ministry. The Gambia's Bureau of Statistics 2013, and 2024 census reports supplied the regional demographic data. Data on climatic variability (1990-2021) were obtained from the Meteorology Department.

5. Data Analysis

The scrutiny of the climate data was aimed at the similarities between the observed climate data and household observations. To approximate trends in temperature and cumulative rainfall over time using the monthly values, the Mann-Kendall test and Sen's slope estimator (Sen, 1968) were utilized. Descriptive statistics were utilized to analyse weather events and climate change impact. The association between migration and the windstorm frequency, increased rainfall, flood and drought, cross tabulation was used while migration was treated as the dependent variable.

5.1. Demographic information of respondents

The demographic characteristics in Table 4 display the average age of interviewees in the NBR as 43.9 years. This implies that interviewees experienced the effects of climate change over a substantial period. 61.4% were male and 38.6% were female, a reflection of male dominance as household heads. Of the interviewed 415 households, 81.7% were married. 13.3% were single, 4.1% were widowed, and 1% were divorced while the average number of people per household is 15.6, 39.5% received Qur'anic education 22.2% had secular education. 11.6% had tertiary education. primary education is 10.4%, while unlettered is 8.0%. This displays the abysmal level of conventional literacy. 63% are agriculturists. Businessmen and shop owners constitute 25%, civil servants 21.4%, and petty traders 19%, Casual labourers, handicraftsmen, and construction workers constitute 15.7% and 13.5% respectively. Artisanal mining, remittances, and professionals constitute the lowest income sources of the NBR. Astonishingly the migration level is not reflected in the remittance earnings, due to abject poverty.
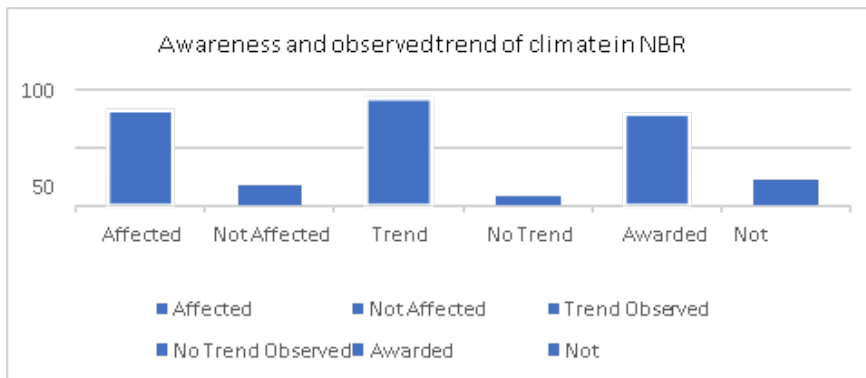
Table 4

Demography Information

Average Age of Respondent		43.9
Gender	Male	61.7
	Female	38.3
Household head	Yes	61.4
	No	38.6
	Sibling	9.4
	Son/Daughter	37.2
	Auty/Uncle	2.5
Relationship with the household head	Husband	3.8
	Wife	38.4
	Mother	4.4
	Father	3.8
	No formal education	7.5
	Pre-school	0.5
	Primary	10.4
	Secondary	22.2
Level of edu Attained	Tertiary	11.6
	Technical (TVET)	0.5
	Adult literacy	8
	Madarassa	39.5
	Agriculture/Farm /animal /fishing/horticulture	63
	Proceeds as shop/business owner	25
	Proceeds from market sales (non-farm)	19
	Civil servant salary	21.4
Source of income	Salary from industry (firm, factory, corporation)	11.6
	Salary from labour (handicrafts, construction)	13.5
	Day Labor-Temporary	15.7
	Artisanal Mining	10
	Remittances	30
	Less than 5000	52.5
	5000 to 15,000	35.4
level of income	15,000 to 25,000	6.7
	25,000 to 35,000	4.6
	35,000 and above	0.7
household size		15.64

5.2. Awareness, trend and impact of climate change

Climate change impacts are real. Figure 1 shows that 78.6% of interviewees are conscious of climate variability, whilst 92% noticed changing trends in weather elements, indicating a high level of awareness. Additionally, 21.4%, 8% and 11.7% were unaware of the changes, signifying a degree of ignorance.

Figure 1

Distribution of Climate Change Awareness, Trend and Impact in the NBR (%)

5.3. Perceived changes in weather elements

Table 5. presents changes in the weather elements. 78.6%, 88.3%, 92% and 54% professed rainfall, windstorm, temperature and relative humidity respectively as changing. 21.4%, 11.7%, and 8% while 46% perceived no change. All the weather elements, interviewees asserted, save relative humidity, whose chances they are ignorant of, are rising.

Table 5

Perceived Changes in the Weather Elements (%)

Weather elements	Yes	No
Erratic rainfall	78.6	21.4
Windstorm	88.3	11.7
Increased Temperatures	92.0	8.0
Relative humidity	54.0	46.0

5.4. Climate change variability for the region

Table 6 summarises the statistics of climatic variability (1990-2021). The average total annual rainfall of 882.2094 mm, had a standard deviation of 205.3124mm, whilst the annual mean maximum and minimum temperatures were 35.3235 oC and 20.4217 oC respectively (standard deviation 0.4518oC and 1.3924 oC,) signifying a fairly constant and low variability in the minimum and maximum temperatures. The annual mean relative humidity was 59.2707% (standard deviation of 3.3766%).

Table 6

Summary Statistics of the Climate Variability of the NBR

Variable	Mean	Std. deviation
Total Annual Rainfall	882.2094	205.3124
Average Maximum Temperature	35.3235	0.4518
Average Minimum Temperature	20.4217	1.3924
Average Relative Humidity	59.2707	3.3766

5.5. Climate variability summary statistics

In Table 7. Mann-Kendall's trend test analysis was conducted to determine the fluctuation (1990-2012) of total rainfall (mm), maximum temperature (oC), minimum temperatures (oC), and relative humidity (%). The data displays a statistically significant trend of 0.0330 for rainfall at a 5% significant level. A maximum temperature trend of 0.0005 at a 5% significant level and a minimum temperature (oC) of 0.0083 at a 5% significant level. The Sen's slope values show a positive slope for total rainfall and maximum temperature of 10.7010 and 0.0303. while a negative slope was observed for minimum

temperatures (oC) and relative humidity (%), -0.0741 and -0.0162 respectively, (Table 7). However, the magnitude of the increasing trend is higher in the annual maximum temperature (oC) (0.0303) than the decreasing annual minimum temperature (oC) (-0.0162). Total annual rainfall is increasing progressively. This brings into focus the findings of Bayo and Mahood (2023), who asserted that rainfall patterns since 1994, show variability he attributed to climate change impacts.

Table 7

Summary Statistics of the Climate Variability of the NBR

	Kendall's Tau	**S**	**Var(S)**	**p-vale**	**(Two-tailed)**
Total Rainfall (mm)	0.2661	132.0000	0.0000	0.0330	10.7010
Maximum Temperature (oC)	0.4234	210.0000	0.0000	0.0005	0.0303
Minimum Temperatures (oC)	-0.3266	-162.0000	0.0000	0.0083	-0.0741
Relative Humidity (%)	-0.0263	-13.0000	3799.6667	0.8456	-0.0162

Figure 2

Summary Statistics of the Climate Variability
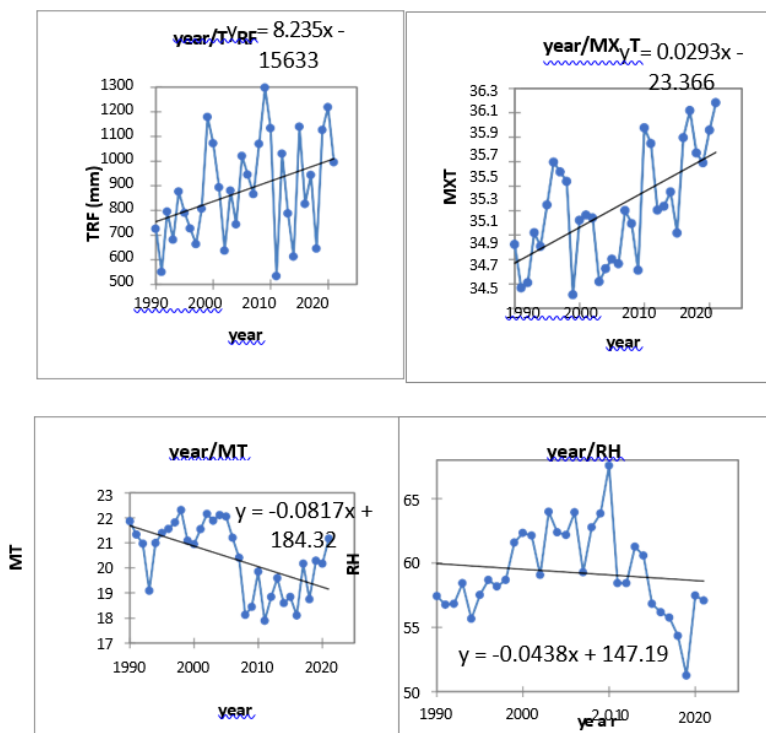
5.6. Distribution of extreme weather events (%)

Floods, increasing rainfall, temperature, windstorms, and drought, are associated with climate change impacts. Figure 2 displays their distributions. 41.5% of interviewees admitted that windstorms have a vital climate change impact. Windstorm frequencies escalated over a decade, with secondary data from the Department of Meteorology showing that windstorm occurrences rose from 1 to 13 (2010-2020). This complements the IPCC (2023) report that extreme storms, … often have significant societal impacts. It matches the findings of the 2020 population and housing survey, confirming that between 2017 and

2018, windstorms and flash floods affected 5,299 people and displaced 3,806 and 4,634 respectively, (Bureau of Statistics, 2020). Increased temperatures impacted climate change. This harmonises with the IPCC (2023) statement that there is an increase in the intensity and frequency of high temperatures and a decrease in the intensity and frequency of cold extremes.

The year 2022/2023 witnessed an increase in rainfall countrywide, associated with its recurrence interval. Rainfall has continued to increase over the years (Figure 3). Furthermore, this development has been worsened by poor farming practices and bushfires, aggravating the effects of climate change. Figure 3 harmonizes with Friel et al (2021), the increased occurrence of extreme weather events such as flash floods, droughts, windstorm and resulted in the spontaneous displacement of more than 17 million people in Africa since 2008.

Figure 3

Distribution of Climate Change Impacts (%)
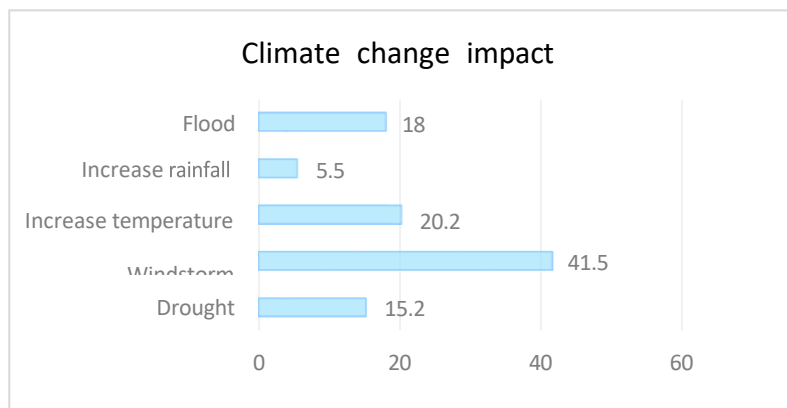
5.7. Properties affected by extreme weather events

Table 8 shows the distribution of the areas affected by climate-extreme events. 37.6% of interviewees believe that their homes are the most affected by climate-extreme events, caused by the frequency of windstorms. As windstorms increase, schools are also affected, supported by 16.2% of the interviewees. Agricultural practices are also affected by climate-extreme events. 15.9% and 10.9% of gardens and livestock are affected.

Table 8

Distribution of Areas Affected by Extreme Weather Events (%)

| Areas affected	%
Home	37.6
Livestock	10.3
Vehicle	0.3
School	16.2
Farmland	15.9
Garden	10.9
Road	8.8

5.8. Impacts of drought, windstorms, flood, increased rainfall and temperatures. The impact of drought

The NBR is on the fringe of the Sahara. Figure 4 displays the effects of drought. The noticeable effect caused by increasing temperatures is crop failures amounting to 48.3. Hence, famine was recorded at 31% as the second important effect of drought. Water scarcity, loss of lives and properties, amounted to 10.4%, 5.3%. Water scarcity could result from an increase in temperatures which aggravates

evaporation and evapotranspiration. This lowers the water table and starving trees of water. As the NBR has its western section adjacent to the sea, droughts exacerbate saltwater intrusion.

Figure 4

*The Impact of Drought on the People of NBR (%)*
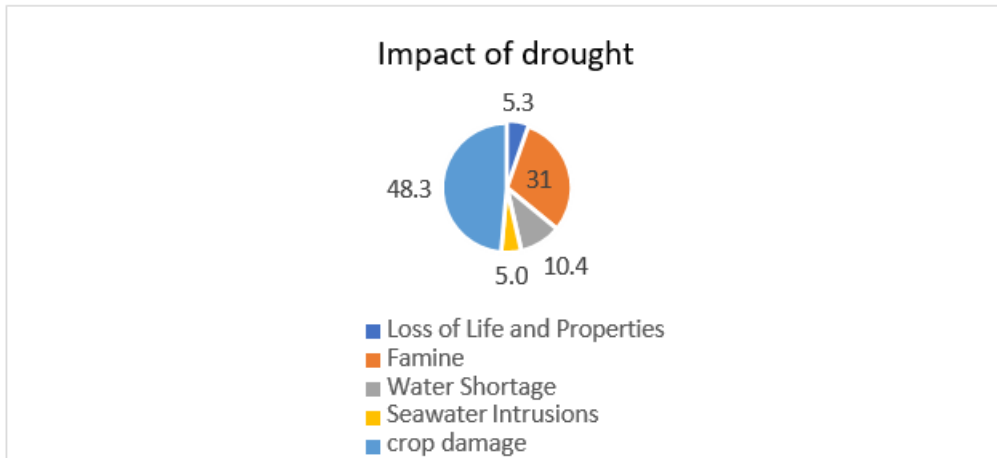
5.9. The impact of windstorms

Figure 5 shows windstorm impacts that caused infrastructural damage, and loss of farmlands, lives and properties, which interviewees reported as the most affecting them, registering 21.4%, 18.6% and 16% respectively. Furthermore, it causes emotional trauma (13,4%), pollution (11.1%), power outages (10,6%) and reduced tourism activities (8.9%).

Figure 5

Distribution of the Impact of Windstorms on the People of NBR (%)
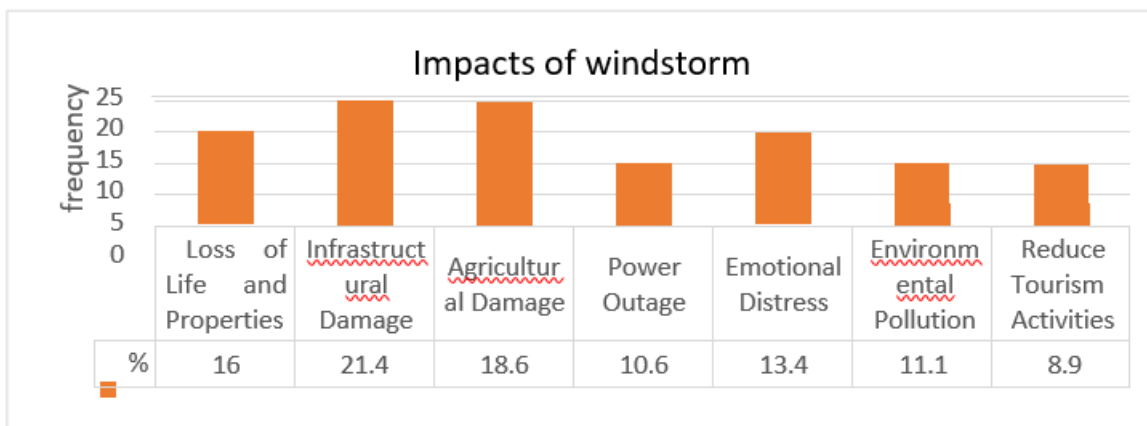
5.10. The impact of increased rainfall

Figure 6 illustrates the effects of increased rainfall. The study shows that 25% and 20% of interviewees reported youth education and the danger of waterborne diseases as the most serious. Others include crop damage, displacement of people and loss of properties registering 11%, 10.7% and 10.5% respectively. Additionally, 9.9%, 8.7% and 4.2% of interviewees complained of financial losses, emotional stress and wildlife and eco-system damage respectively as the least affected. Noteworthy is that increased rainfall does not mean the absence of droughts. When the duration of rainfall is shorter than usual, the distribution is uneven, accompanied by increasing temperatures, and then the rate of evaporation supersedes the rate of recharge, causing drought.

Figure 6

Distribution of the Impact of Increased Rainfall on the People of NBR (%)
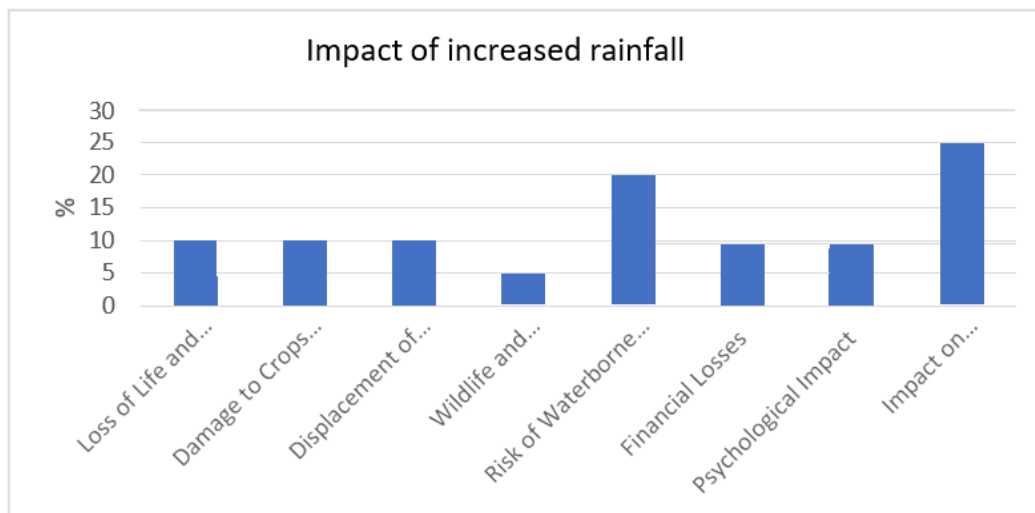
5.11. Soaring temperatures

Figure 7, Distribution of the impact of increased temperatures (%).

The study shows that temperature increase affected their welfare (22%) and the main source of livelihood. 18.1% of interviewees claimed that crop damage is the severest effect of temperature rise.

Uncharacteristically high temperatures affected well-being through poor farm yield.

A demonstrated long-run effect of rising average surface temperature is its negative effect on productivity in agriculture, (Cattaneo & Peri, 2016).

Figure 7

Distribution of the Impacts of Increased Temperatures
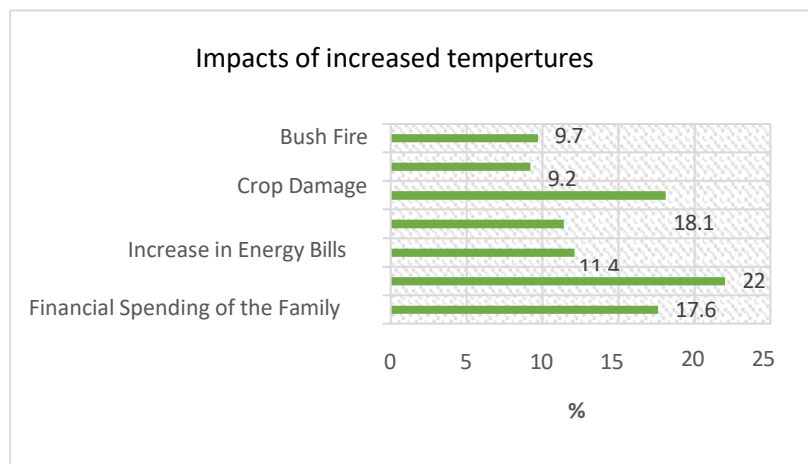
5.12. Educational attainment

Migrants' destination varies but internal migrants target Banjul (the Capital), the West Coast Region, and Brikama. With the advent of irregular migration, youth from the region opt for Europe (47.5%). The Basic education system comprises three different levels, Lower Basic Education, Upper Basic Education and Senior Secondary Education. Figure 8, shows the percentage gross enrolment rate and completion rates at the Lower Basic Education level of the NBR from 2011 to 2021. Enrolment for the region at the lower level has been increasing steadily over the years and has reached the MDG for education. Gender

disparity is almost equal. GER has increased from 80% in 2011 to over 130%, whilst completion rates also followed the same trend increasing from 65% in 2011 to over 100% in 2021.

Figure 8

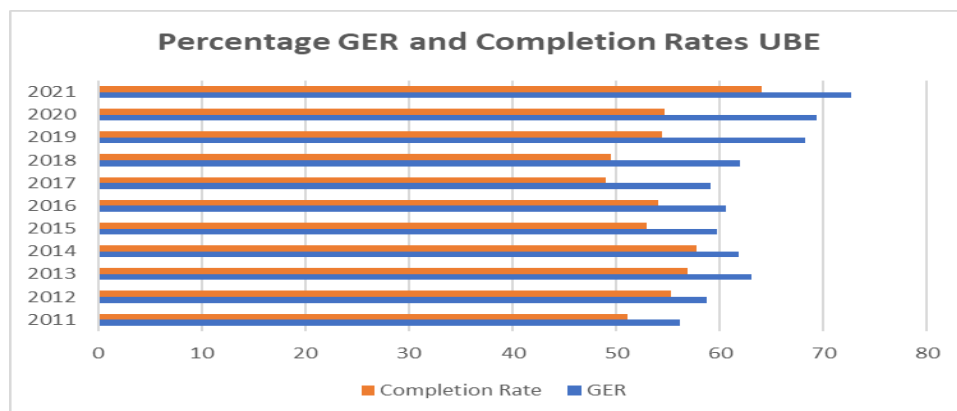*GER and Completion Rates LBE of the NBR from 2011 to 2021(%)*
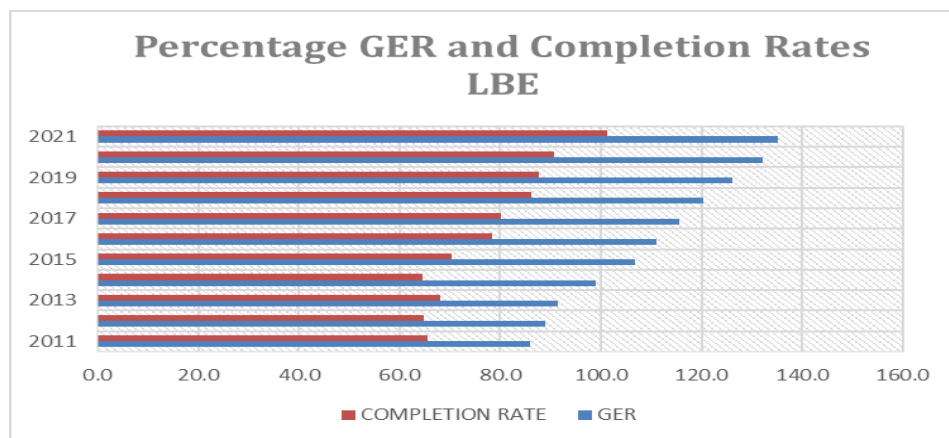
5.13. School completion rates

Figure 9, shows the GER and completion rates at the Upper Basic level for the NBR between 2011 and 2021. Like the LBE, GER and completion rate figures have been steadily increasing over the years. The gross enrolment rate (GER) has also increased across the board Ministry of Basic and Secondary Education (2022). Enrolment figures increased from 55% and 58% in 2011 and 2012 to 65% in 2013. 2019, 2020 and 2012 were the years with the highest record for GER at the UBE in the NBR, registering 67%, 68% and 73%. Furthermore, completion rates have been fluctuating between 49% and 58% between 2011 and 2020, but a significant increase was of 64% recorded in 2021. Although GER and completion rates increased, a decrease was noticed when compared to that of the LBE.

Figure 9

*GER and Completion Rates UBE of the NBR from 2011 to 2021(%)*

5.14. GER and Completion Rates SSS

Figure 10, above shows the GER and completion rates of students in SSS in the region. Both GER and completion rates have decreased greatly. 2020 and 2021 recorded the highest GER for the SSS, the rest from 2011 to 2019 have GER less than 35%. However, a significant drop is witnessed from the lower levels. The same phenomenon applies to completion rates, as it decreased to 36% in 2021, the highest for 11 years. However, both GER and completion rates for the region continue to drop as students climb the ladder to higher grades. There is a high dropout rate in the NBR.

Figure 10

*GER and Completion Rates SSS of the NBR from 2011 to 2021(%)*
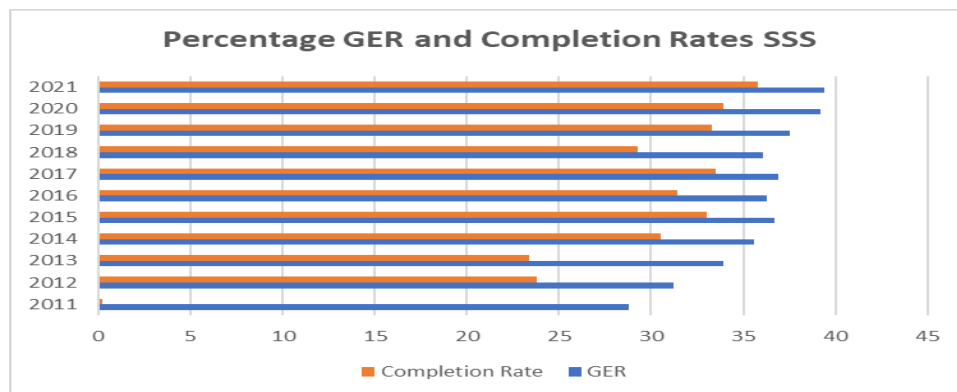
5.15. Interruption experienced in education

Figure 11 shows the percentage of interviewees who experienced disruptions in their education due to climate-extreme events. 50.8% of interviewees responded that education was interrupted by climate-extreme events, and 49.2% stated unaffected.

Figure 11

*Disruption Experienced Education Due to Climate Extreme Events (%)*
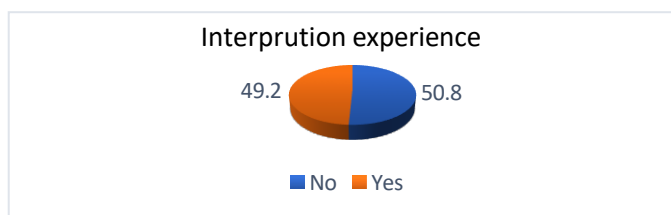
5.16. Extreme events affecting education

Figure 12 shows the extreme climate events that affected education. In Figure 3, the major impacts of climate change were the extreme events and education was severely impacted by windstorms. Hence, 63.9% of interviewees reported windstorms as climate-extreme events that affected education. Flooding ranked second and 18.3%. Increasing temperatures were stated to have affected education by 4.8% of interviewees. The least of 2.9% and 2.8% of interviewees felt that drought and wildfires affect education in the region.

Figure 12

*Climate-Extreme Related Events That Affect Education in the NBR (%)*
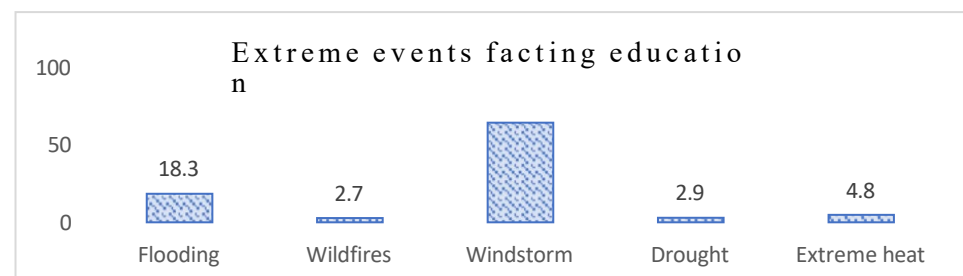
5.17. Climate change impact on educational attainment

Extreme events had lasting impacts on education. Figure 13 displays the distribution of extreme events' impact on education. What constitutes schooling (65.6%) is problematic among students due to climate-extreme events.

Windstorms blow away school roofs, collapse walls and destroy furniture rendering them unusable for periods, thereby reducing student contact time. Another effect is the dropout rate. 34.4 % of interviewees reported.

Figure 13

The Distribution of Climate Extreme Impact on Education in the NBR (%)
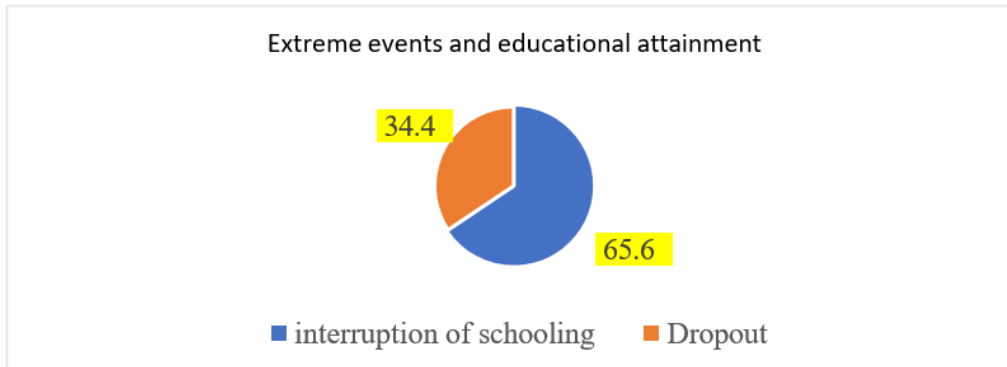
5.18. Association between migration and extreme climate events

Table 9, indicates the association between migration and severity of occurrence of extreme climate events. The cross-tabulation shows that 63.9% and 83.2% of interviewees believe that windstorms and droughts are increasing, leading to migration. Only 49.5% and 30% believe that rainfall and flooding are rising. This shows the capacity of people to put up with the impacts of increased rainfall and flood, compared to that of windstorms and droughts.

Instead, 62.3% and 50% believe that windstorms and drought are declining, but they will migrate, whilst 54.4% stated that despite a reduction in rainfall and flood migration persists, a testimony of the mindset over migration and attests to the numbers leaving. Hence, migration is an adjustable capacity of the people to the impact of climate change.

Table 9

Association between Migrated (Dependent Variable) and Frequency of Occurrence of Drought, Flood and Windstorm (Independent Variables) (A Crosstabulation)

Frequency of Occurrence			Windstorms			Increased Rainfall			Flood			Drought		
Options			0	1	2	0	1	2	0	1	2	0	1	2
		Count	62	19	16	48	30	19	48	30	19	11.9	13	11
migrated	0	% Migrated	63.9	19.6	16.5	49.5	30.9	19.6	49.5	30.9	19.6	83.2	9.1	7.7
		Count	198	73	47	173	71	74	173	71	74	61	24	36
	1	% Migrated	62.3	23.0	14.8	54.4	22.3	23.3	54.4	22.3	23.3	50.4	19.8	29.8

5.19. The association between migrated and occurrence extreme climate events (a crosstabulation)

Table 10 depicts a crosstab between; Have you migrated for the last five years (dependent variable) and severity of drought, rainfall, increased temperatures and windstorms (independent variables) (see table 8), chi-square for severe drought and floods were found to be highly significant recording P values of

0.003 and 0.001 (p<0.05), windstorms and heavy rains, were found to be insignificant with P-values of 0.757 and 0.218. Hence, it indicates that drought and floods can cause people to migrate simply because there is little, they can do about it, whilst windstorms and heavy rains are not causing any migration in the NBR.

Table 10

Shows the Association between Migrated (Dependent Variable) and Severity of Occurrence of Drought, Rainfall and Windstorm (Independent Variables) (A Crosstabulation)

Severity	Drought			Windstorm			Increased Rainfall			Flood		
	Value	df	Asymptotic Significance (2-sided)	Value	df	Asymptotic Significance (2-sided)	Value	df	Asymptotic Significance (2-sided)	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	11.392[a]	2	0.003	.557[a]	2	0.757	3.047[a]	2	0.218	13.390[a]	2	0.001
Likelihood Ratio	11.818	2	0.003	0.565	2	0.754	2.944	2	0.230	13.900	2	0.001
Linear-by-Linear Association	5.395	1	0.020	0.000	1	0.994	0.017	1	0.896	13.349	1	0.000
N of Valid Cases	415			415			415			415		

5.20. Migration impact on educational attainment population trend

Figure 14 shows the population trend during the past six censuses. The NBR Population dwindled between 1973 and 1983 from 18.9% to 16.3%. In 1993, it further decreased to 15.1%, 12.7% in 2003, 11.9% in 2013 and 10.3 % in 2024. This designates a steady emigration.

Figure 14

Population Trend in the Region (%) (Gobs 2024)
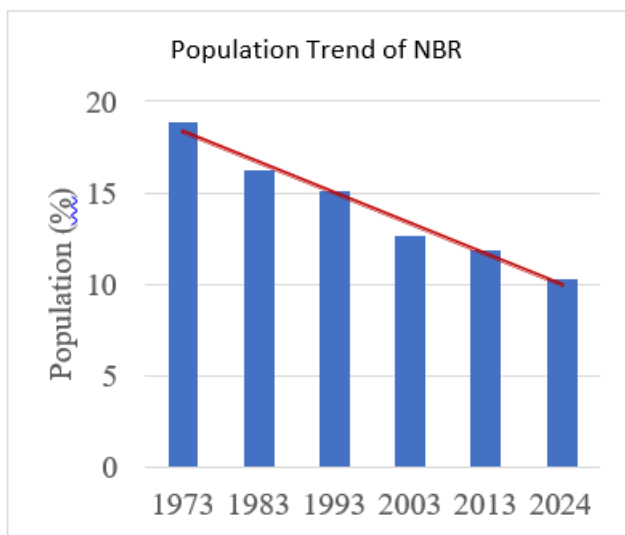

5.21. Youth population

The attention focused on the youth attests they are in the majority in conformity. This is with the situation in the country where the population is largely youthful, with 40.8 % under 15 years of age, (GBoS, 2024). As of 2023, the NBR youth population aged 15+ was 142,141(Gbos, 2023), principally unemployed but assisting their parents on the farms during the farming season.

5.22. Common prevalent migration

Figure 15 revealed that 60.8% of the majority of the people relocated to urban areas, this was validated by the Gambia Bureau of Statistics National Migration Analysis (2013), which stressed that of the 140,761 Gambians' rural-urban migrants and more than 28.0% of them were rural born in Kerewan, areas nevertheless, 93.0% of them were enumerated in the urban centres. Noteworthy is that Banjul, the capital city, witnessed a negative population growth over the last twenty years due to out-migration to the adjacent emerging residential and industrial conurbation. Most people moving from urban-rural migration are peculiar among those on postings either as civil servants or staff of Non-Governmental Organisations (NGOs), GBoS, 2013).

Figure 15

*Distribution of Migration' Types (%)*
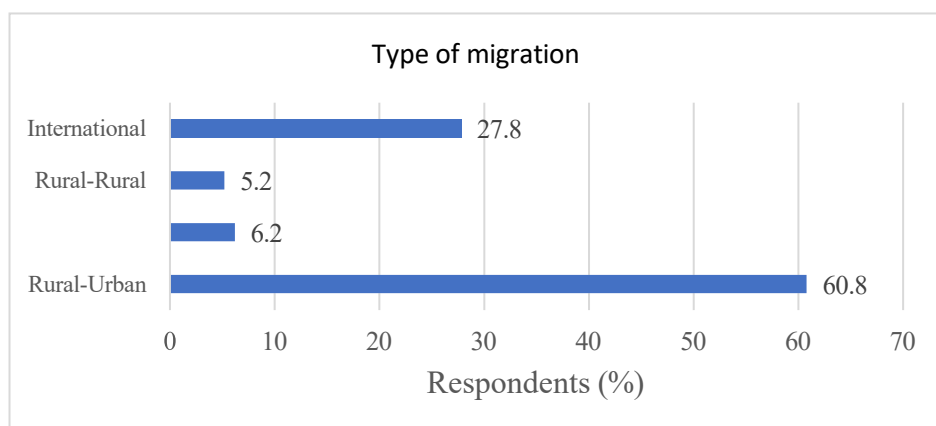
5.23. Migrants destination

Figure 16 shows the destination countries of the migrants. The breakdown reveals that 47.5% went to Europe, 29% left for internal urban areas, 11.3% relocated to African countries, 9.9% left to America and 2.4% to Asia. Europe ranks highest due to illegal migration. The same findings were made by Armitano (2017), highlighting that people moving out of rural areas to urban and/or other countries. Hence Europe and North America have become an enduring end point.

Figure 16
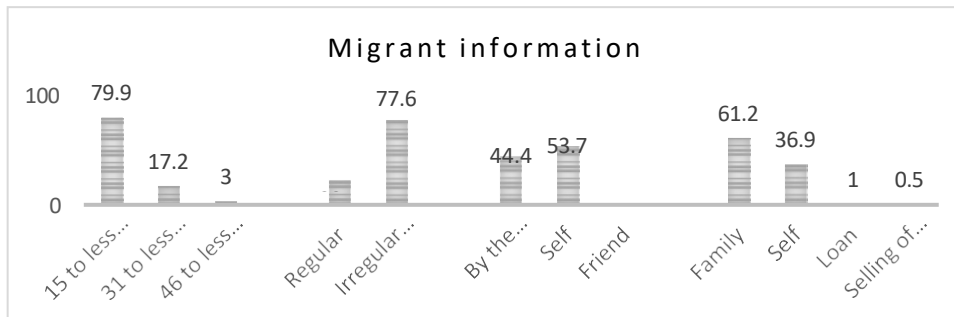
Destination of Migrants (%)
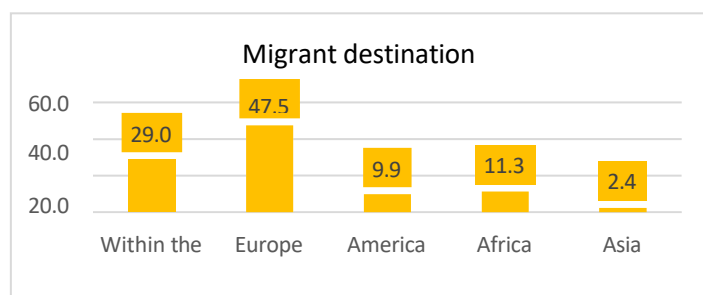
5.24. The average age, route taken, migration decision-making and trip financing

Figure 17 shows the spreading of migrants' average ages, the preferred route, the decision-making process and financing. The average ages between 15 to 30 were found to be the principal age bracket, in line with The Gambia Bureau of Statistics National migration analysis (2013), reinforcing of that the propensity to migrate was high among the youthful population in the 15–29 age bracket with the proportion being larger in the age group 20–24 (15.1%), and a majority of them 77.6% opt for irregular routes. 53.7% of them obtained finances from family and close relatives. The age bracket of 31 to 45

migrates less than the former age bracket. Nevertheless, 53.7% go unaccompanied after prudently saving although, they fall back on remittances from family members when they are stuck midway.

Figure 17

Distribution of Average Age, Route Taken During Migration, Migration Decision-Making and Trip Financing (%)

5.25. Education levels with skilled and unskilled migrants

Figure 18 shows the level of education of migrants and their skills. According to interviewees, 75.4% of unlettered migrants acquired pre-migration skills and only 24.6% of them are unskilled. For those with primary education, 60% are skilled, and 40% are unskilled. Amongst migrants with Quranic education, 45.7% are skilled, whilst 54.3% are unskilled. Furthermore, 39.9% of migrants with upper basic education are skilled and the majority 60.1% are unskilled. The majority of migrants with senior secondary and tertiary education are less skilled.

Figure 18

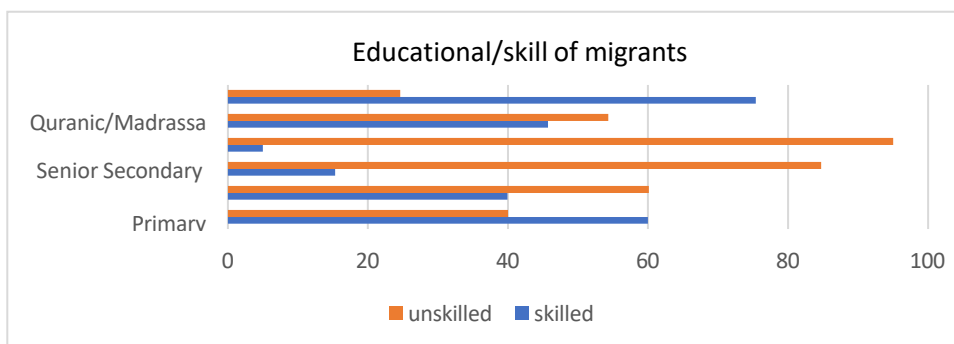*Distribution of Level of Education with Skilled and Unskilled (%)*

Table 4, examines the levels of education attained by domestic migrants. The result indicates that of the total number of migrants, 40% received primary education. Increasingly, 30% attained secondary level and 20% attained tertiary levels after migration, with 10% not accounted for. 45.45% of the total number attained secondary levels, while a significant portion 38.64% advanced to tertiary education after migration. Quranic/madrassa education registered 71.4%, of which 14.3% could only attain secondary education after migration. Finally, migrants who attained tertiary education before migration retained their educational attainment level, signifying stability and consistency in their outcomes.

6. Field Observations

The study revealed that the age bracket 15 to 30 years old are mostly involved in migration, followed by those from 31 to 45 years old while the least are those from 46 to 65 years old. Hence the younger generation are migrating (77.6%). Most of them make the decision independently. In some instances, family members foot the bill for the benefit of the household. Funds are generated through loans and sales of family assets.

Migrants' education is often jeopardized. The majority leave only with a Qur'anic education with no prospect of further education in Europe, while 58.8% had a senior secondary education. 20% and 51.9% of them had only primary secular education. Except for those with senior secondary education, most had no intention of schooling in Europe. However, migrants with Qur'anic and primary education are handymen like carpenters, bricklayers, tailors, fishermen and drivers. carpentry, masonry, tailoring, printing, fishing, and driving. Secondary school leavers are the least skilled as they were acquiring Western education more on their education for a considerable period dropping out of school. The exodus was triggered due to unemployment, desire to fend for the family, underemployment, layoffs, and associated farming problems. Others include political refuge, inadequate infrastructures, relocation of a Households, insufficient farmlands, natural disasters etc. Family income sources were negatively impacted by extreme heat thereby jeopardizing food self-sufficiency. It also leads to bushfires.

The NBD has scattered settlements with inadequate road networks. Interviewees were reluctant to participate because some households were uninterested while others found the process to be time-consuming. Some household heads were absent hence others were substituted. Focus group discussions were difficult due to the scepticism about divulging information. Besides, there was no material/cash. Finally, the heat of the sun was daunting.

7. Summary and Conclusion

The NBR experienced climate change-induced environmental changes which have caused an increase in rainfall. However, the rainy season has become shorter, compared to the pre-1990 years before. There is a correlation between the severity of climate extreme events and the frequency of occurrence. The variability trend of rainfall, maximum and windstorms are increasing, whilst minimum temperatures decreased from 1990 to 2021. Consequently, flooding, crop damage, soil infertility, loss of life and properties, health issues, and infrastructural damage result.

The focal climate change impacts are an increase in average rainfall, maximum temperatures and windstorms, and a reduction in minimum temperatures. School enrolment rates completion rates in the upper grades, and school contact time and dropout rates are inversely proportional. Insatiable desire to migrate among the 15-30 years age group pervades the area. Migrants finance themselves and save when they are cash-striped enroute before seeking assistance. Those with Qur'anic education are more skilful than those with secular education.

8. Recommendations

Climate information, statistical baseline, and early warning signs should be available and affordable. Government priorities should include the availability of programmes for the legal migration of skilled and unskilled youths. Education policies should address job creation, the ministry should prioritize quality education in rural areas to ease frustration. Technical education should provide skills for dropouts who cannot cope with the conventional curriculum. climate change education should be incorporated into the education curricula to enlighten pupils on its impact, mitigation, and adaptation strategies. Concerted efforts should decentralize development in rural areas, in collaboration with Non-Governmental Organisations. Public enlightenment campaigns on the risks associated with irregular migration should be intensified. Also, the provision of alternative learning methods to support displaced populations in times of need would be helpful. Agricultural Extension Workers should assist in forest regeneration and educate farmers on adaptation mechanisms. To foster greater awareness among marginalized groups, sensitization efforts should be implemented at community levels.

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