Aging, Resilience, and Migration in the Sudano-Sahelian Ecological Belt in Nigeria

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From the Sudano-Sahelian Zone to the coast, Nigeria is experiencing a variety of environmental change impacts, whether resulting from slow-onset changes or sudden shocks. These uptakes in events are significantly influencing migration decisions and livelihood resilience. The Sudano-Sahelian Ecological Zone, where natural resources form the foundation of livelihoods and food security, is a critical part of the environmental non-migration discussion. This study examines the relationship between environmental changes and non-migration outcomes. It also explores the household resilience of older non-migrants in the geographical area. The study utilized the LSMS-ISA datasets 2010-2018 (920 respondents, persons aged >50). The Food and Agriculture Organization (FAO) RIMA-II methodology was adopted and remodeled to measure a household's migration resilience and the level of relational variation among multi-faceted drivers of migration. The findings revealed that structural factors such as the environment (soil toxicity, average mean temperature and water security), economic drivers, and agricultural practices were observed to harm households' resilience and trigger more out-migration. On the other hand, drivers such as social and political factors were found to aid environmental non-migration among households. Furthermore, findings from the trend analysis (2010-2018) revealed that the non-migratory resilience of households was low, although it increased significantly during the examined period. Evidently, due to the heightened impact of environmental stressors, agricultural values and practices would continue to threaten food security and poverty levels, leading to increased cases of the "trapped" aging population.

Keywords: non-migration, environmental change, resilience, greying population, Nigeria

INTRODUCTION

Scientific evidence has revealed that climate change is already occurring across space, place, and time (IPCC, 2013). The unprecedented levels of these environmental changes have dire implications not only at the global level but also are nestled within regional, national and sub-national levels. The immediate impact is being experienced more in the least developed countries (LDCs), small island developing states (SIDS), and landlocked developing countries (LLDCs), where the majority of the localized population are poor and more vulnerable to the impact of these environmental stressors (Black et al., 2013; IPCC, 2013; IOM, 2019). These earth-shattering variations mirror the overloading of the earth's ecological and biophysical systems, leading to the direct loss of water resources, desertification, stratospheric ozone depletion, and biodiversity caused by an unprecedented explosion in the human population, that has led to an uptake in economic activity and damaging environmental practices (Warner et al., 2013).

According to findings of the IPCC (1990: 22): "The greatest effect of climate change may be on human migration as millions of persons will be displaced due to shoreline erosion, coastal flooding and agricultural disruptions." Since the past decade, on an annual basis large populations of persons are displaced by events of drought, flash flooding, and tropical storms. Following these statistics, the IDMC (2020) reported that an estimated 24.9 million persons were displaced by non-anthropogenic disasters alone in 2019, which included 95.9% weather-induced displacement cases across 140 countries and territories. Furthermore, a recent World Bank forecast projected that environmental change due to climate variability will be the leading determinant of migration flow with an estimated 143 million environmental migrants over the next three decades in sub-Saharan Africa, Asia, and Latin America (Rigaud et al., 2018). What is most noteworthy, is the reality that a large population in the global South who are susceptible to climate risks do not migrate but remain in-situ (see for example, Foresight, 2011; IOM, 2018; Mallick, 2019).

The majority of the climate change environmental and social impact assessment studies have concentrated on the fast hydrological changes and impact on small island developing states (SIDS) in the Pacific Ocean and Indian sub-continent such as in Tuvalu, Fiji, and the Maldives, alongside regions with mega delta such as in Bangladesh and Nigeria. However, gradual and slow-set changes which are often attributed to desertification will continue to affect large populations in the long term. For example, data showed that towards the end of the last century (1970-2000), an estimated 718 million people were directly affected by storms compared to 1.6 billion persons affected by droughts (Cutter, 2009). According to the IOM (2019), population displacement related to environmental stress events, whose intensity and frequency are often magnified by climatic change, has become the ever-present and the biggest humanitarian challenge being confronted especially within poorer and more vulnerable nations. This is a concern co-shared among academia and policy-

makers as depicted by the growing number of scientific studies investigating the potential links between climate change, extreme environmental events, and human migration (Black et al., 2013).

Studies show that the global migration landscape is being adversely altered by environmental change, specifically via its influence alongside a range of traditional drivers of human mobility such as economic, social, and political factors. It has long been established that the source of human migration causation is not linear-oriented but multi-causal. However, the range and complexity of the interactions between these drivers mean that it will rarely be possible to distinguish between economic and environmental migrants (IDMC, 2020; Mallick and Schanze, 2020). These migratory processes are generated and swayed by complex and dynamic interactions between direct and indirect proximate factors leading to a decision on whether to migrate or not (Foresight, 2011). This is differentiated from other well-known theories such as the simplistic push-pull models, NELM (Stark, 1978; Stark and Taylor, 1991) or the migration transition theory (Zelinsky, 1971; De Haas, 2010; Skeldon, 2012).

As aforementioned, the majority of the world's population directly impacted by environmental change in poorer nations do not migrate. For instance, Foresight (2011) terms non-migrants impacted by environmental change as "trapped populations". This generalization is biased, and it hinders the understanding of migration triggered by environmental change (Black et al., 2011; Adams, 2016). Having these complexities in mind Schewel (2019) classifies non-environment migrants into four categories: left behind (involuntary), stayers (voluntary), non-migrants (voluntary) and immobile (involuntary). To limit inherent mobility bias and to enhance simplification, this study does not distinguish between voluntary and involuntary non-migrants. Thus, understanding the complexity and variability associated with the drivers of migration is matched by comparable uncertainty as regards the broader relationships between environmental change and migration. This has contributed towards the dearth of empirical studies assessing the relationship between climate-related environmental events and migration (Black et al., 2008).

A research gap exists in the understanding of how and why greying populations opt not to migrate and understanding the implications of their non-mobile state, degree of resilience and locations depends on a detailed analysis of interrelated environmental, political, economic, demographic, and social structures operationalized at multiple levels. This study seeks to answer the following pertinent questions relating to the drivers of non-migration in the environmental change context: Does a household's resilience play a significant role in making non-migration decisions? Why are greying cohorts in these stressed areas less impacted by traditional drivers of migration? To support a more detailed analysis of environmental and other migration drivers, this study seeks to explore the role of resilience in mediating the relationship between household vulnerability to environmental change and (im) mobility in the Sudano-Sahelian zone of Nigeria. The study is divided into five sections which consist of the introduction, material and methods, result, discussion,

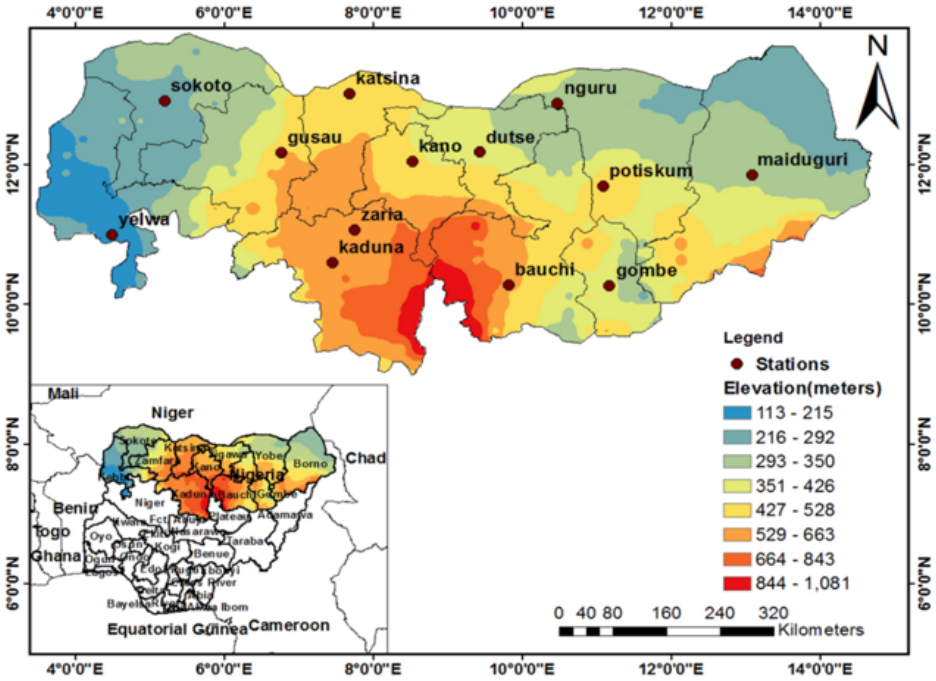
and conclusion.

METHOD AND DATA

Study area

The study is positioned within the Northern Guinea and Sudan-Sahel Savanna Ecological Zone (SEZ) of Northern Nigeria. This SEZ is geographically located between Latitudes 6˚ 27′ N to 140 001 of the Equator and Longitudes 2˚ 411 E to 140 42′ E of the Greenwich Meridian (see Figure 2). The zone outspreads from the Chad Basin passing through the Northern highlands to the Sokoto plains at its western boundary (Odekunle et al., 2008). This SEZ occupies one-third of the total land area of Nigeria (Aremu and Olatunde, 2013).

Figure 1: Map of Nigeria showing the Sudano-Sahelian Ecological Zone



Source: Authors' compilation

Data source

The secondary data for this study came from the General Household Survey-Panel (GHS-Panel) executed in partnership with the World Bank Living Standards Measurement Study (LSMS) in conjunction with the Integrated Surveys on Agriculture

(ISA) programme – LSMS-ISA. The GHS-Panel, a nationally representative survey of approximately 22,200 households from 500 enumeration areas (EAs), was selected for the panel component; 2018/19 is the most recent round of the survey with prior rounds conducted in 2010/11 and 2015/16 (NBS, 2019). The selected study population consisted of about 920 (n=920) respondents aged 50 years and above, selected on the conditionality that they all reside within Sudano-Sahelian Ecological Zone and have also not migrated since the first survey in 2010.

Study models

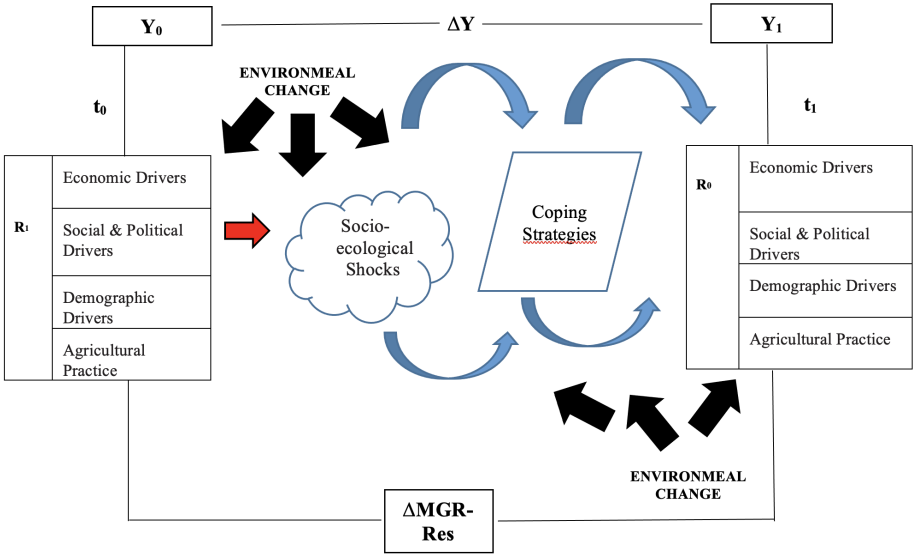
The context-specific resilience indicators used in this research, mitigate against the inherent bias of migratory causation linearity. This enables the analysis of multi-causal issues that are combined, with attention paid to the interaction and interconnection of the different facets of households' resilience to environmental and other migration drivers. The aim is to examine what drives and fosters aging household non-migration resilience. The study aimed to capture the level of interactions of the varying drivers of migration and the resilience of aged persons to these factors (pull and push). The selection of variables to construct the latent non-migration resilience measure is bedrocked on well-grounded mobility-centered literature (see the conceptual framework in Figure 2).

To conduct the analysis, this study used structural equation modeling (SEM).[1] The study adopted and augmented this framework, that was developed by the FAO (2016) and tested in a variety of contexts (RIMA-II measures household resilience). It builds on the existing resilience framework by assessing both temporal and spatial trends. The analysis factored in the multi-causal drivers of environmental migration. The observed variables were selected specifically for the case of Northern Nigeria to reflect both theoretical factors (Foresight, 2011) and contextual factors (Zickgraf, 2018; 2019; Mallick and Schanze, 2020; Schewel, 2020) in the literature as well as data availability.

As a result of persistent environmental shocks, a series of coping strategies are activated by the household such as assets smoothing, consumption smoothing, and in some cases, households opt to migrate. Over the long term, the strategies could lead to an increase or decrease in $\boldsymbol{Y}$. Any change in $\boldsymbol{Y}$ affects a household's non-migration resilience capacity and, consequently, can limit future capacity to react to shocks (see Figure 2).

1 Structural equation modeling (SEM) is a general modeling framework that incorporates many common statistical techniques, such as factor analysis and multiple regression analysis used to analyze the structural relationship between measured variables and latent construct.

Figure 2: Non-migration resilience (MGR-Res) conceptual framework



Source: Adapted from FAO (2016)

Description of variables

The model assumes that change is constant. Thus, the non-migration resilience of an individual or household can be described by the adaptive capacity concerning traditional drivers of migration, such as economic, social, demographic, and policy factors (Black et al., 2011), and how the affected individual or household copes amidst environmental change.

$$MGR_{RES} = \underbrace{f(EVD_{it}, ED_{it}, PD_{it}, SD_{it}, DD_{it}, APT_{it})}_{\text{Latent Variables}} + \varepsilon_{it}$$

The combined scores in this index can be expressed in the equation as follows, where: MGR_RES=Migration Resilience; EVD=Environmental Drivers, ED=Economic Drivers; PD=Political Drivers; SD=Social Drivers; DD=Demographic Drivers, and APD=Agricultural Practices Drivers.

Table 1: Description of study variables

INDICATOR	VARIABLE	OBS	MEAN	STD DEV
APT	Herbicide	920	1.52	.50
	Pesticide	920	1.88	.32
	Inorganic Fertilizer	920	1.61	.49
	Organic Fertilizer	920	1.90	.30
	Machinery	920	1.90	.30
DD	Distance (Pop center)	920	22.23	8.60
	Population Density	920	3422.2	265.5
	Age Distribution	920	60.6	9.55
	Gender	920	1.45	.50
ED	Remittance	920	1.98	.12
	Housing	920	3.24	.92
	Income	920	1.97	.17
	Non-Foodexp	920	1.75	.43
	Foodexp	920	1.96	.18
	Depend	920	1.75	.43
	Coping	920	4.24	4.44
EVD_A	Fuel	920	5.23	1.82
	Sanitation	920	1.99	.37
	Water Source	920	8.67	1.08
	Water Security	920	1.85	.61
EVD_N	Wetness Index	139	14.51	1.61
	Toxicity	131	1.00	.00
	Avg Temp	920	261.4	3.63
	Avg Precipitation	920	1424.8	250.1
PD	Insurance	920	1.97	.08
	Health Service	920	3.59	1.07
	Internet	920	1.22	.36
	Electricity	920	1.73	.23
	Assistance Food	920	1.91	.29
	Assistance Cash	920	1.94	.24
SD	Marital	920	2.43	3.193
	Relationship HHhead	920	2.65	1.932
	Religion	920	1.49	.24
	Migrate	920	5.43	1.22
	Literate	920	1.38	.45
	Morbidity	920	1.93	.22

Source: Computed by authors from LSMS-ISA data

RESULTS

Table 2: Basic characteristics of respondents

VARIABLES	FREQUENCY (%)	VARIABLES	FREQUENCY (%)
AGE n=920		**LITERACY STATUS *n*=742**	
50-59	487(52.9)	Yes	457(61.6)
60-69	262(28.5)	No	285(38.4)
70-79	118(12.8)		
80-89	43(4.7)		
90-130	10(1.1)		
GENDER *n*=920		**RELIGIOUS AFFILIATION *n*=920**	
Male	531(57.7)	Islam	677(73.6)
Female	389(42.3)	Christianity	241 (26.2)
		Traditionalist	2(0.2)
GEO-POLITICAL ZONE *n*=920		**HIGHEST QUALIFICATION ATTAINED *n*=553**	
North East	366(39.8)	None	254(45.9)
North West	554(60.2)	Primary education (FSLC)	102(18.4)
		Secondary education(SSCE)	135(24.4)
		NCE/OND/Nursing	26(4.7)
		BA/BSC/HND	26(4.7)
		Ph.D./MASTERS	2(0.4)
		Vocational Studies	8(1.5)
LOCALE *n*=920		**MARITAL STATUS *n*=920**	
Urban	184(20.0)	Married (Monogamous)	402(43.7)
Rural	736(80.0)	Married (Polygamous)	344(37.4)
		Divorced	5(.5)
		Separated	5(.5)
		Widowed	154(16.7)
		Never married	10(1.1)

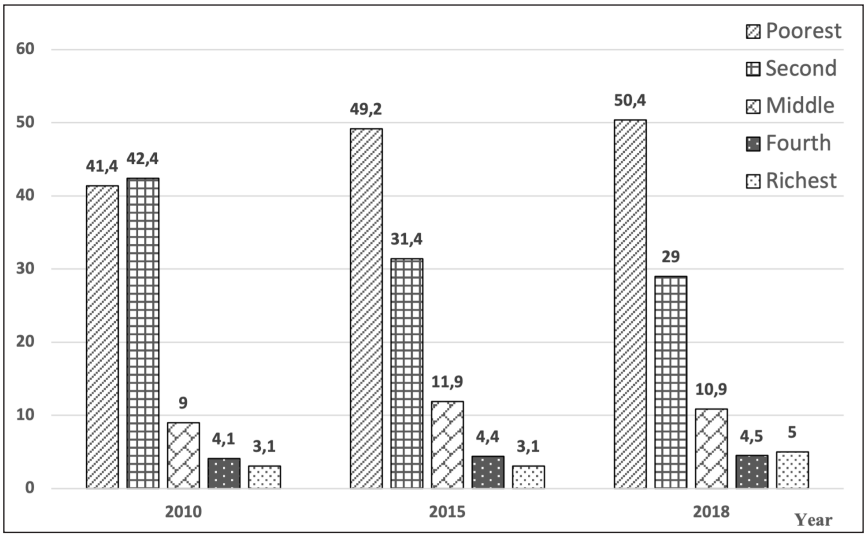
Source: Computed by authors from LSMS-ISA data

FINDINGS AND DISCUSSIONS

Households' livelihood strategies and ways of coping with economic, political, social, or environmental change (- or + or ±) are anchored upon a broad range of factors, including location; relative wealth; security regimes; kinship structures and

other informal institutions; the nature of local governance and social networks; and access to land, food, roads, markets, water, and other resources. Table 2 gives the descriptive statistics of the socio-economic realities of the respondents. The age of the household head determines the security of younger household members in times of climate-related hazards. Based on the age distribution of respondents, those aged 50-59 (52.9%) constituted the largest cohort, followed by those aged 60-69 (28.5%), while persons aged above 90 years (1.1%) were in the minority in line with life expectancy. Gender-wise, males had a 57.7% representation compared to 42.3% of females. In terms of place of residence, 80% of respondents were living in ruralized settings compared to 20% resident in urban locales. Furthermore, respondents in the Northwestern region constituted about 60.2% compared to 39.8% of respondents in the Northeastern region (see Table 2).

Figure 3: Distribution of sampled households by wealth quintile (2010–2018)



Source: Computed by authors from LSMS-ISA data

The result in Figure 4 indicates that household wealth inequalities are widening year-on-year. These dire economic situations could be partly attributed to reduced household revenue accrued from agriculture. This is particularly telling, considering that the bulk of household income is agro-centric, leading to the consequent decline in the share of labor employed in the agricultural sector. This distribution of household wealth trajectory conforms with the results of previous studies (see for example, NPC, 2013, 2019; NBS, 2019). The prevailing economic reality greatly diminished the capability of poorer households to migrate, although certain literature suggests that even at lower-level wealth disparities, households with better socio-economic

standing are most likely to migrate (Bhandari, 2004), while some households may opt not to migrate (Jain, 2010).

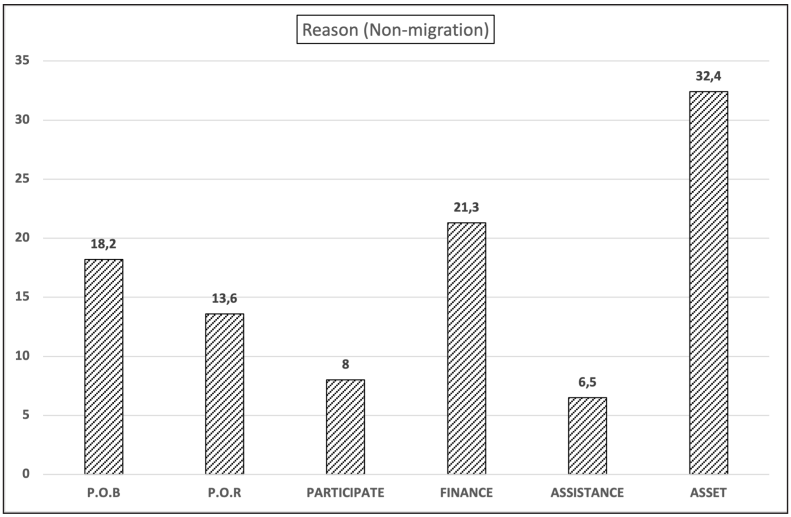
Table 3: Household migratory flow over period 2010-2018 due to arable land loss

Age	**2010** Migration (%)	**2015** Migration (%)	**2016** Migration (%)	**Total**
50-59	32.0	41.0	49.0	40.6
Male	27.4	34.7	32.8	31.6
Female	4.6	6.3	16.2	9.0
60-69	43.0	43.0	42.0	42.7
Male	34.1	34.5	32.9	33.8
Female	8.9	8.5	9.1	8.9
70-79	18.0	10.0	8.0	12.0
Male	14.3	7.3	5.9	9.2
Female	3.7	2.7	2.1	2.8
80-89	7.0	3.0	1.0	3.7
Male	5.6	1.7	0.63	2.64
Female	1.4	1.3	0.37	1.1
90-130	0.0	0.0	0.0	0.0
Male	0.0	0.0	0.0	0.0
Female	0.0	0.0	0.0	0.0
Total	100	100	100	100

Source: Computed by authors from LSMS-ISA data

Table 3 shows the year-on-year trend in households' migratory responses to environmental stress (agricultural income risk) by households within the study area. The result shows that environment-induced migration increased year-on-year among younger-aged households but reduced among older-aged households, likely due to more place-confidence among stay-put factors. Moreover, the findings also revealed that the proportion of female migrants increased within younger households, indicating a tightening of gender-based migratory disparities within the study area. Of significance, is the perception that most men are economic migrants while females are predominantly non-economic migrants, as exemplified in the case study conducted in Ethiopia (Ezra, 2001).

Figure 4: Reason for non-environmental migration among the study cohort



Source: Computed by authors from LSMS-ISA data

NB: P.O.B: Place of birth; P.O.R: Place of retirement; Participate: Communal participation; Finance: Lack of finance; Assistance: Government (local and foreign)/ NGO assistance; Asset: Ownership of farm/animal

This study examines the reason for non-migration decisions among aged individuals/ households based on ecological and socio-economic effects. The result, as presented in Figure 5, shows that 32.4% of the studied individuals indicated that the ownership of land and animals (Warner and Afifi, 2014) was the driving force behind their decision not to migrate despite the effect of desertification. This finding is not out of place when compared with the result of other studies (see for example, Gray, 2010; Mallick and Vogt, 2012). Furthermore, in a region such as the Sudano-Sahelian Zone that is highly ruralized and poor, households without land are more susceptible to environmental migration. Also, 21.3% of the aged non-environmental migrants associated financial accessibility to their non-migration status; this finding is in line with many studies (see Black et al., 2011; Mallick and Vogt, 2012) that suggest that financial opportunities play a significant role in households' decisions to stay put. The results of this study show that 18.2% of aged people opted not to out-migrate from their place of birth, revealing that length of residency breeds more place confidence and social attachment, as these factors promote immobility (Adams and Adger, 2013) and foster adaptive capacity (Lewicka, 2011; Adams, 2016). In all scenarios, the ultimate decisions of older individuals to refrain from migrating, were found to be intertwined and highly associative with economic and social factors within the study area.

Table 4: MIMIC estimation results for resilience measurement

OBSERVED VARIABLE	PARAMETER ESTIMATE (STANDARD ERROR)	OTHER STATISTIC
DD	1	Chi squared
	(Constrained)	18.84
APT	.061	RMSEA
	(.064)	0.051
ED	-.037	
	(.014)	
EVD	-1.853	Average Resilience Score
	(.124)	(2010-2018)
SD	4.126	2010: 21.84(+Non-migration)
	(1.012)	2015:15.26(-Non-migration)
PD	2.571	2018: 26.81(+Non-migration)
	(1.055)	
n = 920; log likelihood = -1156.77 *Significant at *p*<.05; ** Significant at *p*<0.001		

Source: Computed by authors from LSMS-ISA data

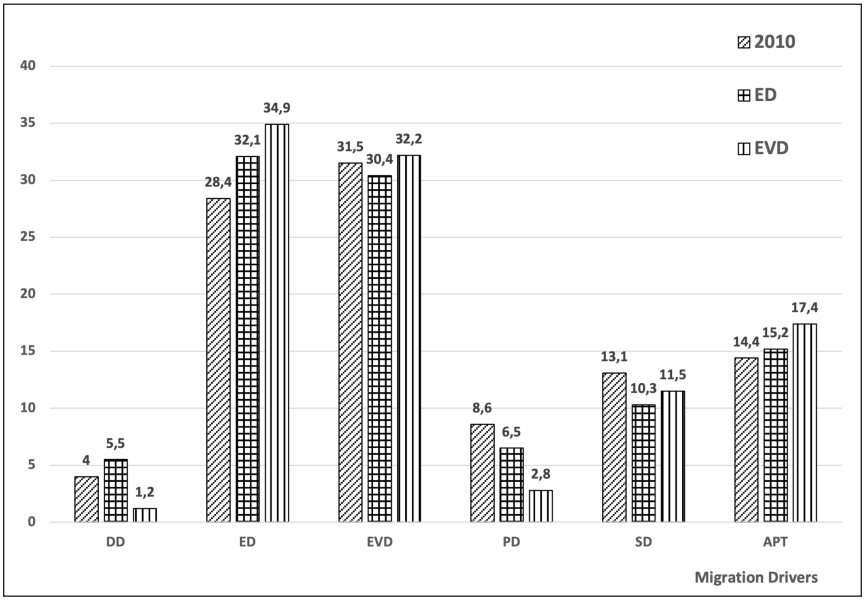
Table 4 presents the household resilience score per driver. The Agriculture Practice scores (A) do not show any clear relationship in terms of household migration resilience levels. The lowest APT scores (where no APT was present) reflect a wide range of resilience scores, suggesting that when risk is not a significant indicator for the household, the association is void and other factors drive resilience levels. There is a very clear negative linear relationship between Economic Driver (ED) scores (B) and overall household migration resilience. The Environmental Driver scores (C) indicate a negative non-linear relationship with household migration resilience. For households in locales with higher risk scores, resilience levels were lower. The lowest EVD scores (where no hazardous risk was present) reflect a wide range of resilience scores, suggesting that when risk is not a significant indicator for the household, the association is void, and other migratory drivers influence households' resilience levels. Political Driver scores (D) are quite low for the entire population of households; however, the relationship with the outcome variable is positive, with some indication of small changes in each predictor variable producing very large changes in resilience.

In the case of Social Driver (SD) scores (E), there is a very clear positive linear relationship between SD and overall household resilience to migration, based on the result (see Table 4). It appears that the elements (observed variables) within the SD indicator may be the strongest drivers of overall household migration resilience. There is great merit in considering the temporal effects of resilience measurement, and patience to observe the actual changes that emerge. As more data becomes available, this will help refine the practice and improve the accuracy of measurement

(see Table 4).

The time series results of the household migration Resilience Index changed over the considered period,[2] household migration resilience decreased (↓43.2%) between 2010–2015, indicating that there was a very high likelihood of households migrating during this time frame. Furthermore, the household's resilience rebounded between the years 2015–2018 (↑43.1%), demonstrating an upturn in the adaptive capacity of households in the Sudano-Sahelian region. In a nutshell, there is a very likelihood of the studied population being trapped in the long term (see Table 4). However, a household's differential and changing vulnerability to or protection from trends, hazards, and shocks among households make it a tricky endeavor because of the complex and transient nature of migration.

Figure 5: Household non-migration resilience by multi-causal drivers (2010-2018)



NB: DD: Demographic driver; ED: Economic driver; EVD: Environmental driver; PD: Political driver; SD: Social driver; APT: Agricultural practices

Source: Computed by authors from LSMS-ISA data

When comparing the contributions of the studied migration drivers, interesting findings emerge. It is noteworthy that the composition and the intensity of these drivers are more skewed between ED, EVD, APT, SD, PD, and DD in the longitudinal analysis. However, the benefit of examining resilience over time revealed that

2 The Resilience Index has been rescaled in order to make a comparison over a three-time period (2010-2018).

additional variables begin to contribute in varying capacities to the overall resilience score. ED, together with EVD, are consistently the most relevant dimensions in all three time periods, accounting for more than 40% of imports. DD and PD are the only pillars that significantly change their relevance over time. DD increases from 2010–2015 but then decreases from 2015–2018 (see Figure 5). In terms of chipping-off household resilience to migration, ED and EVD were found to be the leading determinants of out-migration across time and space in the study area. Considering that the majority of the households' income and livelihood is dependent on agricultural productivity, APT was found to be the driver of weakened household resilience to environmental stressors leading to out-migration (see Figure 5).

DISCUSSION

The study's quantitative findings demonstrate that ownership of land and animals for agricultural uses, and accessibility to finance were the lead determinants of non-environmental migration among older people living within the Sudano-Sahelian region of Nigeria. The result further revealed widening wealth inequalities among households within the space of eight years. The level of regional poverty was observed, considering that the share of employment in agriculture remains over 50% in the socio-ecological zone. This finding is consistent with that of the NBS (2019). It is generally acknowledged that the agricultural sector is the hardest hit by climate change. The majority of households (>60%) in the SEZ consist of rural-based smallholder farmers practising rain-fed agriculture in a dry/semi-arid zone and marginal lands that are highly susceptible to rainfall scarcity, as experienced in other locales within the Sahel region (Alinovi et al., 2009; Alinovi et al., 2010; FAO, 2017; D'Errico et al., 2020). This finding is also consistent with those of De Longueville et al. (2016) which also found that the majority of farmers in the Sahelian arid zone believe that precipitation changes have occurred during the past 20–30 years, whereas in wetter areas (Guinean zone) effects were felt during the past decade, with a resultant impact on productivity and earnings. Also, the effect on a household's resilience is further impacted by the indirect nature of many environmental changes (Foresight, 2011; Warner and Afifi, 2014; Zickgraf, 2018).

Other focal findings are that a household's resilience to migration is extremely impacted by the structural conditions (economic and agricultural practice values). It follows from the above discussion that a range of agricultural practices and economic drivers are highly significant in affecting the relationships between environmental change and migration. These effects are real and observable among the examined households, such as large-scale land acquisitions which increase the vulnerability of populations while decreasing their resilience to future environmental and socio-economic shocks. The study affirmed that economic factors are major push factors in the study area. The major source of the income of the households in the study area is based on rain-dependent agricultural activities where more than 50% of households are fully employed by this sector. These livelihood realities adversely affect the

households' resilience to non-migration. This finding is consistent with observations communicated in several previous studies (see for example, Black et al., 2011; De Sherbinin et al., 2012; Mallick and Vogt, 2012). The result further revealed that social drivers (Ayeb-Karlsson, 2018; Ayeb-Karlsson et al., 2018) such as networks, household structure, place attachment, and health services were found to contribute to the aging population "staying put" within the Sudano Sahelian Economic Zone by assisting these individuals to adapt and also undergo significant (negative or positive) transformations as a consequence of environmental changes.

CONCLUSION

Environmental non-migration decisions are relatively understudied in Nigeria. This study explored the role of resilience in mediating the relationship between household vulnerability to environmental change and (im)mobility in the Sudano-Sahelian Ecological Zone of Nigeria. The result identified three key structural factors that heightened out-migration and two factors that promote non-migration decisions in the study area. Firstly, the study found a household's economic status to be a key decision-making factor – aging persons in the richest households are more likely to migrate away, compared to the majority of poor households, many of which would become trapped because of high migratory costs. Secondly, the environmental stress factors that result from farmland loss, water, and food insecurity, are serious push factors, as exemplified by the mass migratory surge of Fulani cattle-grazing herdsmen southwards in search of green spaces. Thirdly, the evidence revealed that agricultural values and practices in the area which have bonded people and steered their livelihoods in the past are being threatened, thus negatively impacting local food security and heightened out-migration within the Sudano-Sahelian Ecological Zone. On the other hand, factors such as social and political drivers were found to be significant in making the population stay. This trend indicates that both social and political factors were significant in causing households to remain in-situ in the Sudano-Sahelian region. In conclusion, the trend analysis (2010-2018) revealed that the non-migratory resilience of households, although relatively low, has increased significantly during the examined period. This study therefore recommends that the Nigerian Government articulates effective environmental and socio-economic policies that would mitigate against environmental change and improve aging people's resilience going forward.

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