GEOSPATIAL DISTRIBUTION AND PATTERNS OF HUMAN SECURITY INDICATORS IN KWARA STATE, NIGERIA

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Abstract

This study examines the spatial distribution of human security indicators across the 16 Local Government Areas (LGAs) of Kwara State, Nigeria, utilizing geospatial techniques and ArcGIS Pro 3.4. It examines 24 variables across six dimensions: economic and food security, health, personal security, political security, educational security, and environmental security. Spatial analysis reveals significant disparities. Baruten demonstrated food security strengths linked to agricultural land and market access, while Kaiama and Moro faced health and environmental vulnerabilities, including high malaria prevalence and poor sanitation. Personal security issues, such as kidnapping and armed robbery, clustered in Irepodun, Ilorin South, and Ifelodun. Educational gaps were pronounced in Ekiti, Offa, and Patigi, and environmental insecurity, including fire, flooding, and waste mismanagement, was evident in Asa, Ilorin East, and Moro. The study concludes that human security challenges in Kwara State are deeply spatial and require location-specific policy responses. GIS tools provided valuable insights for identifying vulnerabilities and guiding targeted interventions. Recommendations include prioritizing health, education, and sanitation infrastructure in the most affected LGAs, institutionalizing GIS-based monitoring systems, and promoting participatory GIS for improved community engagement. This research demonstrates the importance of spatial analysis in informing strategic planning and fostering equitable development.

Keywords: Human security, spatial distribution, geospatial analysis, UNDP, ArcGIS Pro

Introduction

Human security represents a paradigm shift from state-centered notions of security to people-centered approaches emphasizing individual well-being (UNDP, 1994; Orhero, 2020). It integrates dimensions such as food access, healthcare, personal safety, education, environmental protection, and political stability (Akokpari, 2007; Ani et al., 2021). In Nigeria, and particularly in Kwara State, persistent socio-economic disparities, underdeveloped infrastructure, and rising insecurity demand a localized, data-driven analysis of human security challenges (Orire and Ogunfolaji, 2021; Abdulrasaq, 2018).

Despite numerous governmental and scholarly efforts to improve human development indicators, there is a lack of spatially disaggregated knowledge on how human security threats manifest differently across locations (Ajisegiri et al., 2019; Chukwu et al., 2017). Existing development strategies often rely on aggregated state-level or national data, which obscure intra-regional disparities and hinder precise policy responses (Orire and Ogunfolaji, 2021; Nazarova et al., 2019). In Kwara State, this data gap is particularly problematic, as LGAs experience varied intensities of security challenges, from food insecurity and environmental degradation to personal safety and educational inequality (Abdulrasaq, 2018; Ilesanmi and Rotowa, 2020).

Traditional human security frameworks, while conceptually robust, tend to overlook local-level spatial heterogeneity (Gasper and Gómez, 2022;

Owen, 2003). This disjunction between generalized frameworks and local realities has resulted in ineffective or misaligned interventions. The core problem, therefore, lies in the absence of spatially explicit, context-sensitive models that reflect the geographic and social complexities of human security threats in Kwara State. Addressing this issue requires integrating multidimensional security frameworks with geospatial tools such as GIS, which can visualize vulnerabilities and guide targeted interventions (Li et al., 2023; Buhaug and Lujala, 2005).

Human security, a concept that goes beyond traditional notions of safety to include access to resources, freedom from violence, and overall well-being, lacks a universally accepted definition and measurement approach (Nazarova et al., 2019). Early frameworks, such as the generalized poverty perspective (Owen, 2003), conceptualize human security through socio-economic indicators like income, health, and political freedom. While these perspectives are valuable in understanding well-being, they fall short of providing the spatial specificity needed to analyze variations in human security at local levels, particularly in regions like Kwara State, Nigeria. Other models, such as the Human Security Audit (Gasper, 2013), focus more on individual-level vulnerabilities and are better suited to understanding localized risks. However, they face challenges in terms of data aggregation and subjective weighting of indicators (Bajpai, 2000). The GECHS framework (Gasper and Gómez, 2022), with its multidimensional focus on the intersection of environmental and socio-economic factors, offers greater relevance for regions like Kwara, where these factors significantly influence human security. Nevertheless, ensuring consistency in data across the LGAs remains a methodological challenge (Nazarova et al., 2019).

Frameworks such as the Human Security Report (Arbona et al., 2024), which center on conflict-related fatalities, are less applicable to Kwara State, where human security issues are largely unrelated to conflict. Nevertheless, such models can still offer useful insights into the spatial patterns of violence, should it emerge as a significant factor. Similarly, the Harvard School of Public Health framework (Leaning and Arie, 2000), which defines human security as resilience through material support and psychosocial care, is particularly helpful for

evaluating vulnerabilities at the community level. In addition, Rummel's (2001) broad interpretation of human security, which equates it with freedom including aspects of violence, economic development, and human rights offers a comprehensive framework for analyzing the factors influencing human security. However, despite their strengths, these frameworks are often too general to effectively capture the complexities of human security in specific regional contexts like Kwara State.

Incorporating Geographic Information Systems (GIS) into the study of human security, as suggested by Orencio et al. (2016), Buhaug and Lujala (2005), and Ilesanmi and Rotowa (2020), enhances the ability to visualize and analyze human security indicators at the local level. GIS provides an essential tool for mapping spatial patterns of vulnerability, allowing for a more nuanced understanding of factors such as poverty, environmental risks, and access to resources. In the context of Kwara State, GIS enables the identification of areas with high concentrations of risk, thereby facilitating more targeted policy interventions. However, combining the GECHS framework's multidimensional approach with GIS technology is vital for effectively mapping human security across Kwara's sixteen LGAs. This integrated approach offered a deeper understanding of human security in the region, ultimately guiding policies aimed at enhancing the well-being of its population.

Conceptual and Theoretical Framework

This study is anchored on the multidimensional human security framework proposed by the United Nations Development Programme (UNDP, 1994), which conceptualizes human security as encompassing economic, food, health, environmental, personal, and political dimensions. These dimensions align directly with the indicators examined in this research and provide a structured basis for assessing security holistically. The Global Environmental Change and Human Security (GECHS) framework (Gasper and Gómez, 2022) further reinforces this multidimensional approach by highlighting the interlinkages between socio-economic and environmental factors, which are particularly relevant for regions such as Kwara State, where environmental degradation and socio-

economic disparities converge to shape human security outcomes.

In addition, the Human Security Audit approach (Gasper, 2013) offers a means of evaluating local-level vulnerabilities through both quantitative and qualitative indicators, enabling a context-sensitive assessment. Owen's (2003) geographic approach to human security complements these frameworks by emphasizing the spatial heterogeneity of threats and advocating for location-specific policy responses. This perspective is operationalized in the current study through the application of Geographic Information Systems (GIS), which facilitates the mapping, visualization, and spatial analysis of human security indicators across the 16 LGAs of Kwara State.

By integrating the UNDP framework, the GECHS model, the Human Security Audit, and Owen's spatial perspective, this study adopts a robust conceptual and theoretical foundation that bridges global human security theories with localized, data-driven spatial analysis. This approach ensures that the findings are not only theoretically grounded but also practically relevant for policy-making, enabling targeted interventions to address the specific human security needs of different localities within the state.

Study Area

Kwara State lies in north-central Nigeria, spanning approximately 36,825 square kilometers between latitudes 7°N and 10°30'N and longitudes 3°E and 6°E. The state borders Niger, Kogi, Oyo, Ekiti, and Osun States, as well as the Republic of Benin to the west. With Ilorin as its capital, the state comprises 16 LGAs grouped into three senatorial districts, North, Central, and South (Ajadi and Adeniyi, 2017).

The population of Kwara State was estimated at 3.68 million as of 2024 (World Bank, 2019), distributed unevenly across the sixteen LGAs. The terrain consists largely of savannah vegetation and basement complex geology, with a bimodal climate characterized by wet and dry seasons. Annual rainfall ranges from 990.3 mm to 1318 mm, and average temperatures hover between 33°C and 37°C (Ajadi and Adeniyi, 2017).

The economy is predominantly agrarian, with subsistence and commercial farming forming the
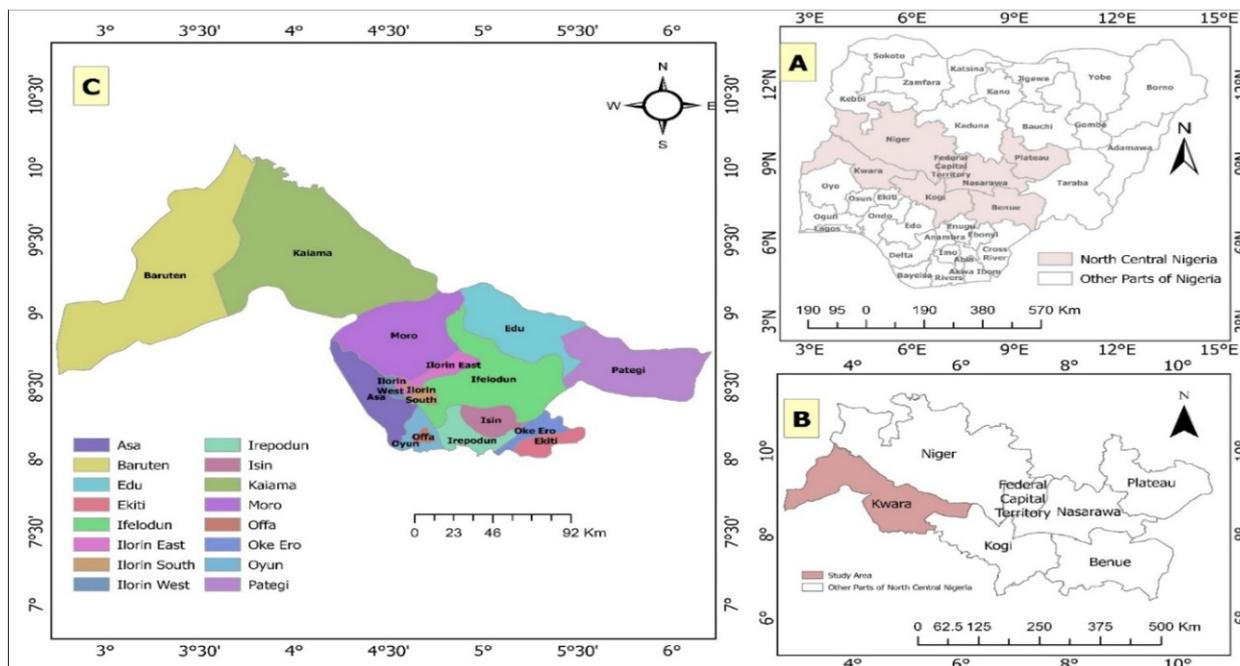
Figure 1: [A] Nigeria showing North Central Zone, [B] North Central Showing the Study Area, [C] Study Area Showing the Sixteen LGAs in the Study Area

Source: Digitized from shape files downloaded from ESRI Website, 2024

backbone of local livelihoods. Despite its educational institutions and healthcare facilities, Kwara faces persistent disparities in infrastructure, environmental sanitation, and human development outcomes (Usman, 2023; Ahmed, 2009). These spatial inequalities make the state an ideal case for assessing localized human security threats using geospatial tools.

Materials and Methods

Data on six indicators of Human Security were extracted from records on LGAs bases from State ministries and agencies of Kwara State, the National Bureau of Statistics, and related agencies, focusing on six human security dimensions (UNDP, 1994). A total of 24 variables were analyzed, with four indicators per dimension, such as:

- Economic/Food Security: industrial presence, unemployment, market access, agricultural land.
- Health Security: malaria incidence, birth rates, improved water access, and healthcare facilities.
- Personal Security: armed robbery, kidnapping, rape, and homicide.
- Political Security: police station distribution, revenue allocation, protest incidents. and violence against civilians.
- Educational Security: enrollment rates, literacy, educational attainment, and secondary school facilities.
- Environmental Security: No of people affected by flood, No of people affected by fire, Total Number of waste dump, and Improved water and Sanitation.

These indicators have been adopted by different governments of Nations and scholars in the measurement of human security (Kanti Bajpai, 2000; Hampson et al., 2002; Owen and Slaymaker, 2005; Asfaw and Tabitha 2016; and Pradhan et al. 2018)

Descriptive statistical tools and ArcGIS Pro 3.4, a geographic information system software, were used. Upon collection and organization of the data according to its geographical reference, it was entered into a Geographic Information System (ArcGIS Pro 3.4). The data tables were mapped subsequent to their integration with the shapefile data tables that delineate the map bounds. The tables were linked

through a common field, namely the GIS code assigned to each spatial unit, ensuring structured data organization within the threat table. This spatial joining process was applied to each dataset alongside its corresponding boundary shapefile. A base map was incorporated into the map view environment, and a standardized threat level scale was designated for each dataset. The data were subsequently superimposed to collectively illustrate the pattern and distribution of aggregated human security threats.

Using ArcGIS Pro, thematic mapping, cluster analysis, and spatial distribution tools were applied to identify variation patterns. Choropleth maps were created to visualize relative intensities of each variable across LGAs. Spatial descriptive statistics supported interpretation.

## Results and Discussion

Economic and Food Security Patterns

Baruten LGA's strong food security, supported by extensive agricultural land (10.2–28%) and market access, aligns with Pradhan et al.'s (2018) view that land availability and connectivity enhance local food systems. The FAO (2021) similarly emphasizes the role of rural markets in promoting food availability and economic stability. In contrast, Ifelodun and Offa show weak agricultural and market infrastructure, limiting their food security potential, a concern echoed by Ajisegiri et al. (2019), who stress that poor commercialization opportunities restrict LGAs development. In Ilorin East, a 20% unemployment rate despite moderate industrial activity reflects a labor-market mismatch. Weisfeld et al. (2020) attribute such trends to industries' limited capacity to absorb local labor, while Străchinaru (2022) highlights the need for targeted skills development to ensure inclusive industrial growth. Addressing these challenges calls for spatially targeted interventions, including market enhancement and vocational training aligned with local industry needs.

Health Security Patterns

The spatial distribution of healthcare facilities in Kwara State reveals notable disparities, with Kaima better equipped (10.5–15.2%), while Moro and Ilorin East lag behind, contributing to heightened maternal
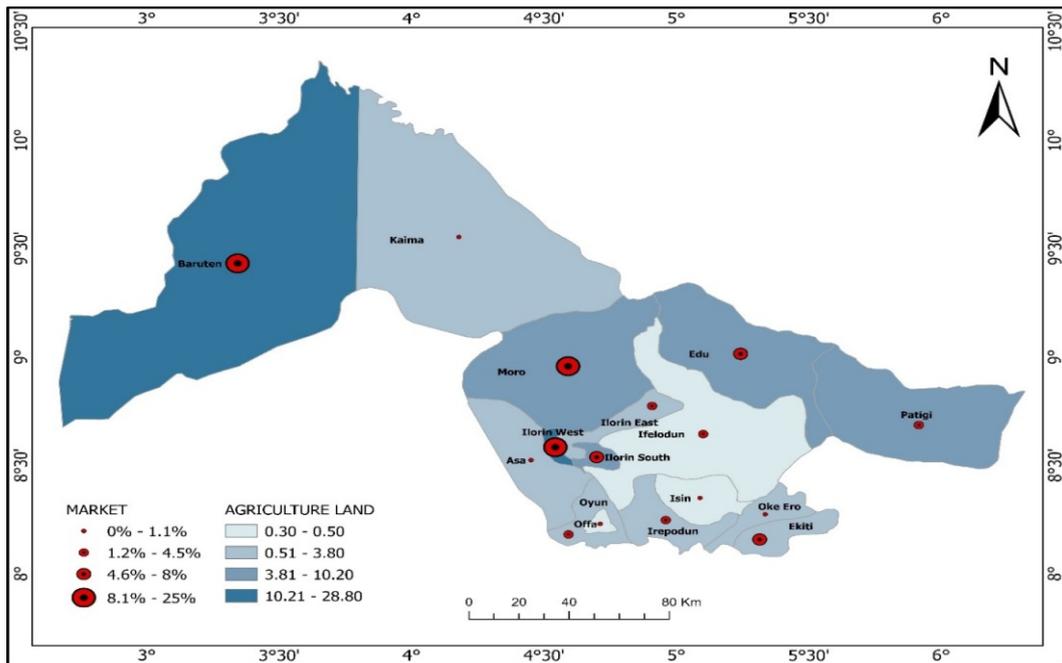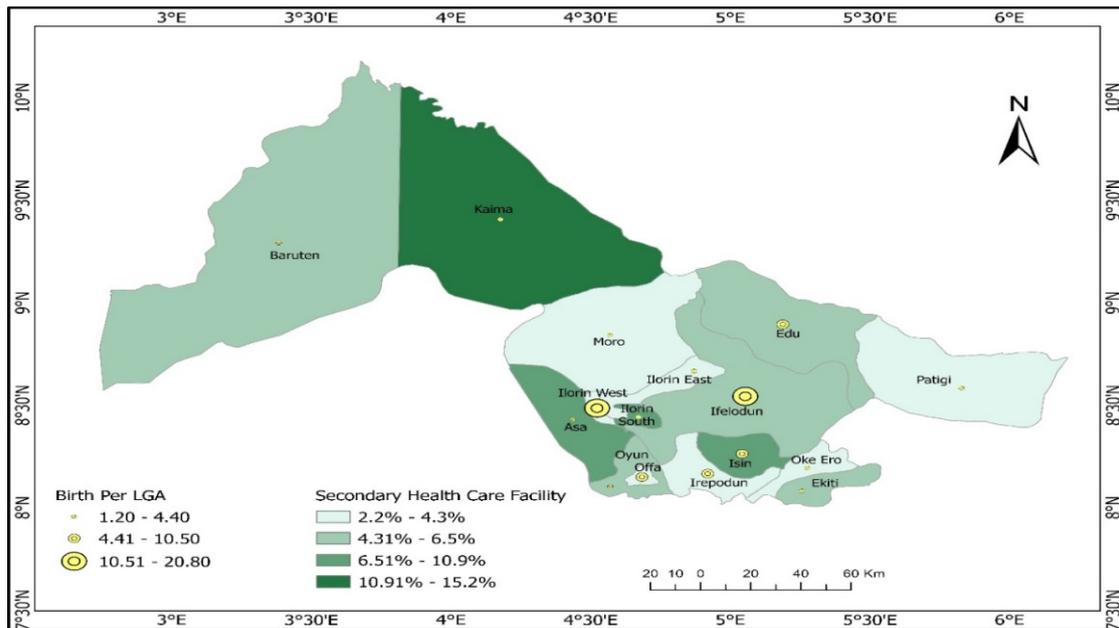
Figure 2: Pattern and distribution of market and plantation in the study area
Source: Secondary Data from Kwara State Ministry of Agriculture, GRIDD3 and National Bureau of Statistics (2024)
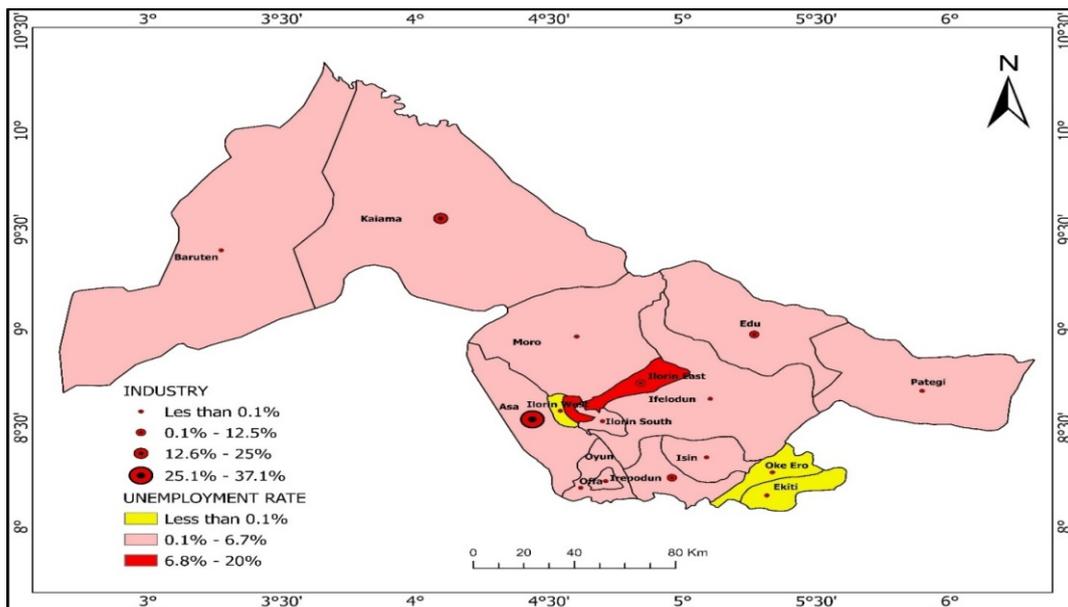
Figure 3: Pattern and distribution of industry and unemployment in the study area
Source: Secondary Data from Kwara State Ministry of Agriculture, GRIDD3 and National Bureau of Statistics (2024)

and child health risks, as supported by Chukwu et al. (2017) and Okunlola and Oyeyemi (2019). Malaria prevalence peaks in Isin (15.1%) and Asa (12.5%), underscoring the interplay between environmental conditions and limited access to preventive healthcare. Additionally, Ilorin East (13.6%) and Edu (9.1%) show the lowest access to improved water sources, raising concerns about waterborne diseases and broader public health vulnerabilities. These spatial patterns, illustrated in Figures 4.3 and 4, highlight the urgent need for targeted, location-specific interventions that prioritize underserved areas to promote equitable human security and sustainable health outcomes across the state.

Figure 4: Patterns and distribution of birth and secondary healthcare facilities in the study area.
Source: Secondary Data from Kwara State Ministry of Health and National Bureau of Statistics (2024)
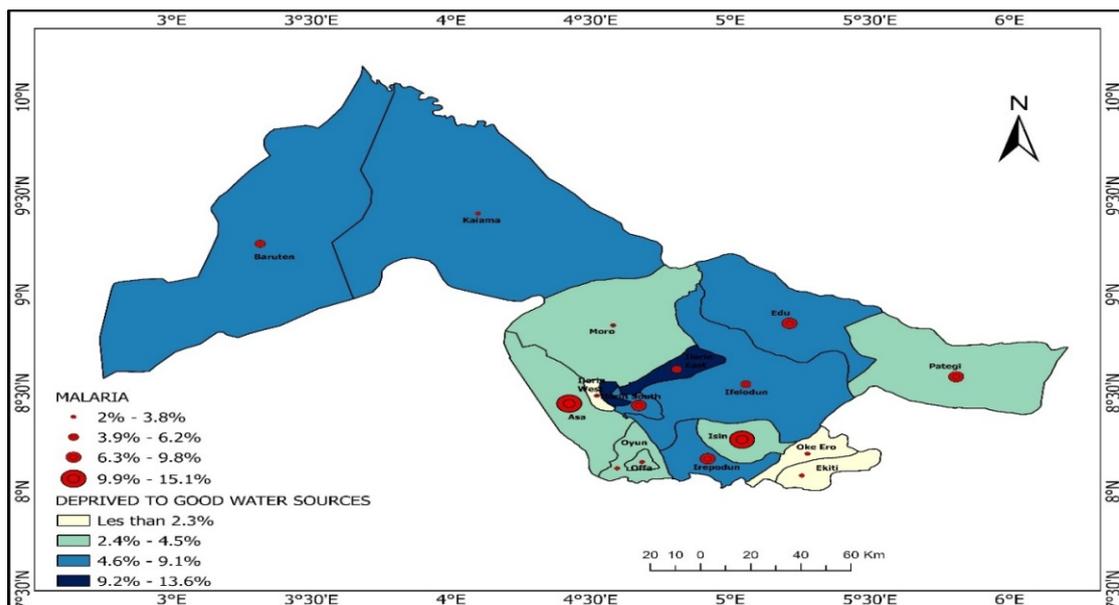
Figure 5: Patterns and distribution of Malaria and deprivation to good water sources in the study area
Source: Secondary Data from Kwara State Ministry of Health and National Bureau of Statistics (2024)

Personal Security Patterns

Figures 4.5 and 6 show that Irepodun faced the highest rate of armed robbery (38.6%), while Ifelodun recorded the most kidnapping incidents (25.8%), highlighting serious security concerns. Ilorin South, Moro, and Kaima also experienced high levels of rape and homicide, suggesting deeper socio-economic vulnerabilities and weak law enforcement presence in these areas. As Benhamza and Ghai (2020) point out, such crimes often thrive

where state institutions are under-resourced and social protection is lacking. These patterns call for targeted, community-based security strategies that respond to the specific risks each LGA faces.

Political Security Patterns

As illustrated in Figure 4.7 and Table 4.1, Irepodun (19.4%) and Ilorin East (10.6%) had the highest concentration of police infrastructure, yet Ifelodun

(60.6%) and Ilorin East (13.5%) reported the most frequent riots and protests. This apparent contradiction suggests that the mere presence of security installations does not necessarily foster political stability or public trust, a concern echoed by ACLED (2024). These findings point to the need for a more holistic approach to security, where community engagement, transparency, and responsive governance are integrated alongside physical policing to address underlying political and social grievances.

Educational Security Patterns

Figures 4.8 and 9 show that Ilorin East had the highest school enrollment (21.3%), while Ekiti, Isin, and Oke-Ero recorded much lower rates, indicating unequal access to education across LGAs. Literacy levels also varied significantly, with Ilorin West and Ifelodun performing better (11.4–14.6%), while Offa and Kaima fell below 5%. These patterns reflect what the National Bureau of Statistics (2018) has described as typical urban-rural educational disparities in Nigeria, often shaped by infrastructure gaps and resource allocation. The World Bank (2021)
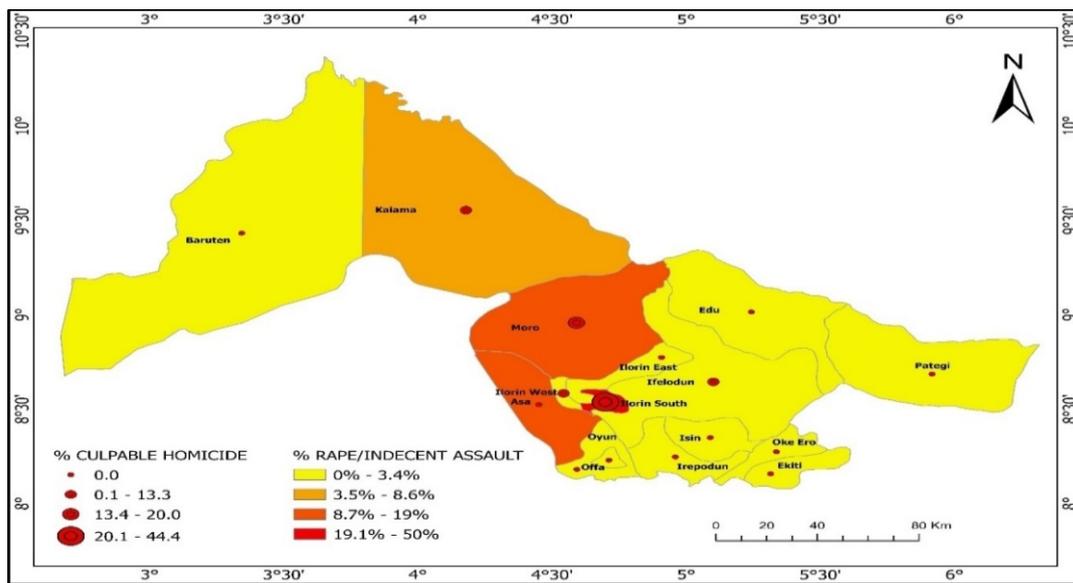
Figure 6: Pattern and distribution of armed robbery and kidnapping in the study area
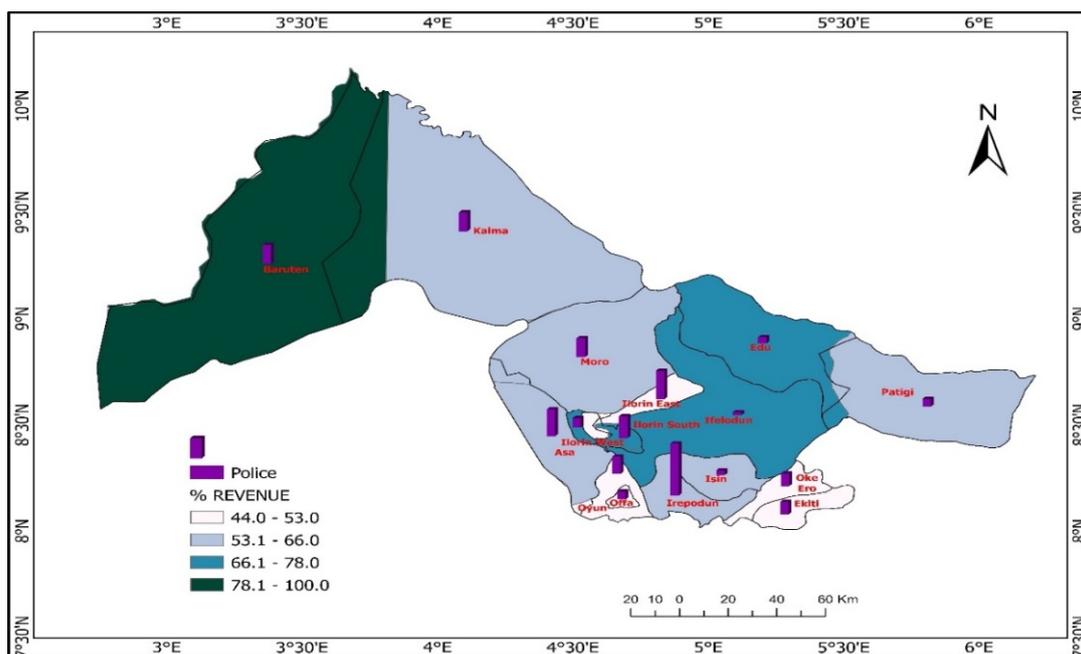*Source: Secondary Data from Kwara State Police Headquarters (2024)*
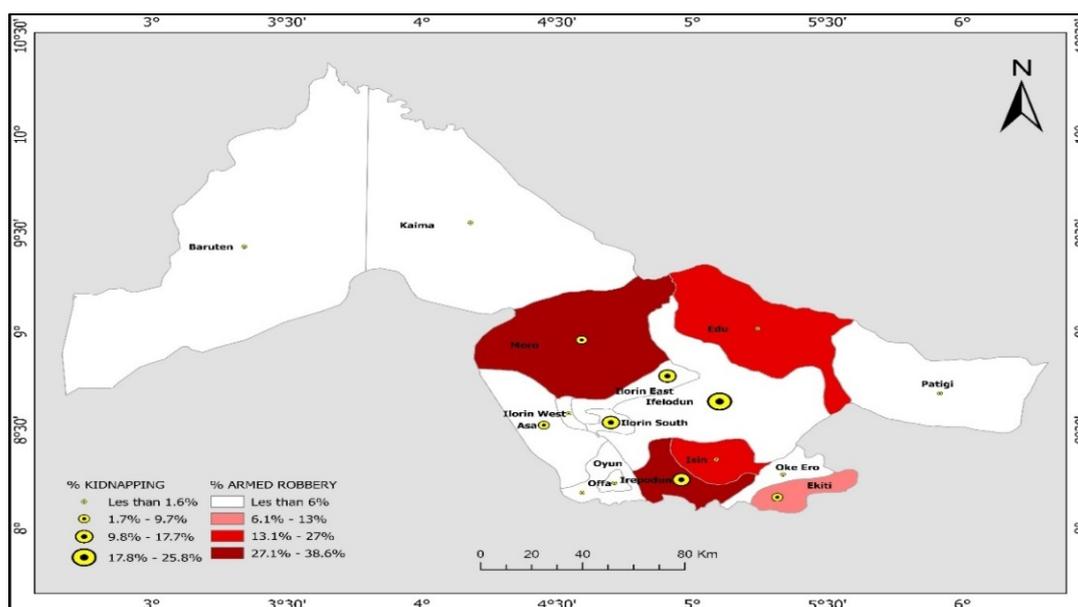
Figure 7: Pattern and distribution of culpable homicide and rape/indecent assault in the study area
Source: Secondary Data from Kwara State Police Headquarters (2024)

further emphasizes that such inequalities limit long-term development and deepen human insecurity, especially in underserved communities.

Environmental Security Patterns

As shown in Table 4.2 and Figure 4.10, flood risk was highest in Edu (29.4%), Patigi (24.5%), and Asa (17.1%), primarily due to their proximity to riverine

zones, which increases exposure to seasonal flooding. This supports findings by Adelekan and Asiyanbi (2016), who emphasized that flood vulnerability in Nigeria is strongly linked to topography and proximity to water bodies. Fire incidents were also concentrated in Moro (20.6%) and Ilorin East (17.3%). A major environmental challenge highlighted in the study is that Asa LGA contains the only state-owned dumpsite, leaving other LGAs to dispose of refuse indiscriminately, a
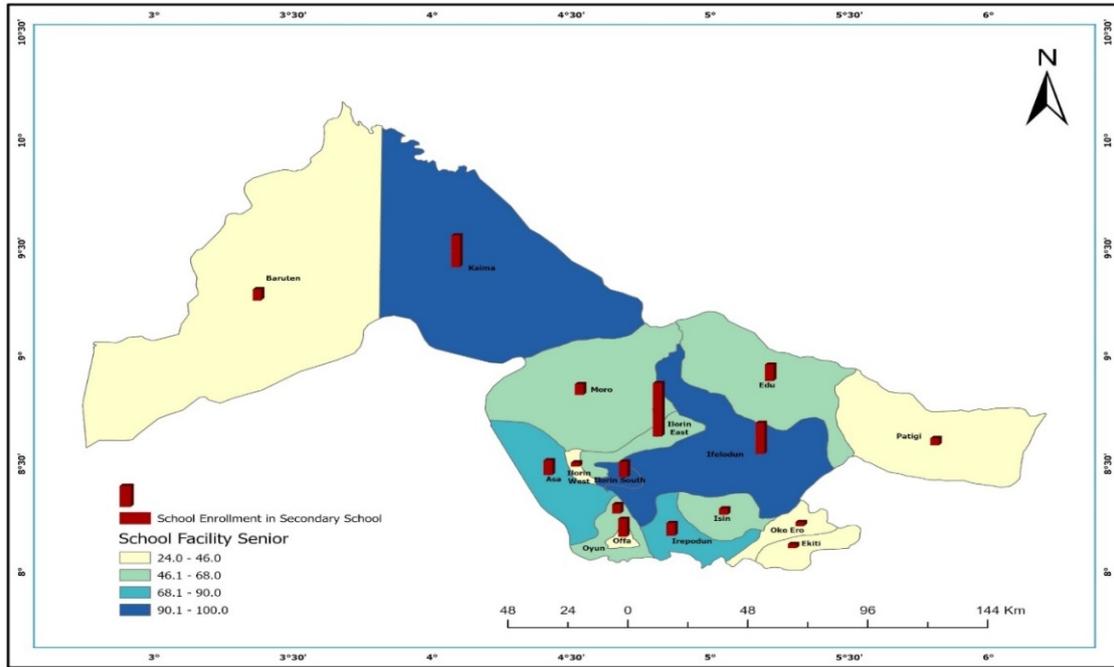

Figure 8: Pattern and distribution of police stations and revenue in the study area
Source: Secondary Data from Annual Abstract of Statistics, Armed Conflict Event Data (ACLED), and Kwara State Police Headquarters (2024)

Table 1: Riot/Protest and Violence Against Civilians

LGA	Riot or Protest	% Riot or Protest	Violence Against Civilians	% Violence Against Civilians
Asa	0	0.0	13	13.3
Baruten	1	0.6	0	0.0
Edu	0	0.0	2	2.0
Ekiti	0	0.0	10	10.2
Ifelodun	94	60.6	23	23.5
Ilorin East	21	13.5	19	19.4
Ilorin South	6	3.9	6	6.1
Ilorin West	1	0.6	6	6.1
Irepodun	1	0.6	4	4.1
Isin	0	0.0	3	3.1
Kaima	0	0.0	1	1.0
Moro	10	6.5	6	6.1
Offa	16	10.3	3	3.1
Oke Ero	2	1.3	1	1.0
Oyun	2	1.3	0	0.0
Patigi	1	0.6	1	1.0
	155	100	98	100

*Source: Researcher's computation 2024*

Figure 9: Patterns and distribution of secondary school enrollment and educational facilities in the studied area
Source: Secondary Data from Annual Abstract of Statistics, and Kwara State Ministry of Education (2024)
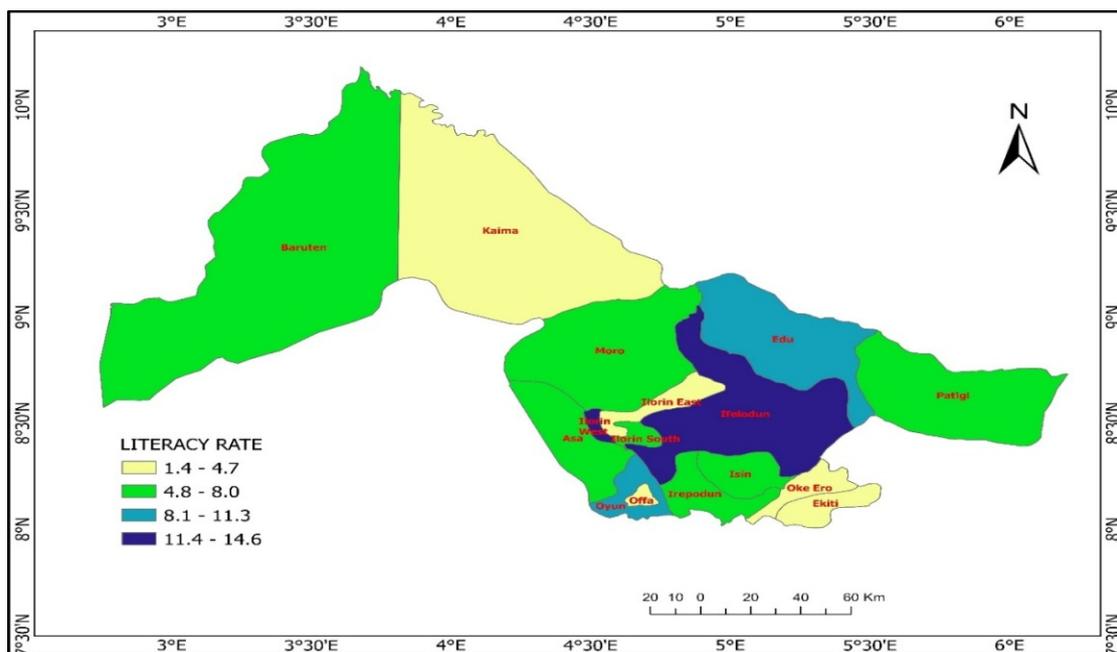
Figure 10: Pattern and distribution of literacy rate in the study area
Source: Secondary Data from Annual Abstract of Statistics, and Kwara State Ministry of Education (2024)

condition that significantly increases public health risks. The situation is worsened by limited access to improved water and sanitation, with Asa itself lacking these facilities despite hosting the dumpsite. This aligns with WHO and UNICEF (2023), who stress that poor sanitation infrastructure near waste sites accelerates disease outbreaks. Furthermore, only 13% of residents in Ifelodun and about 8.7% in Baruten, Edu, Ilorin South, Irepodun, and Isin have access to improved water and sanitation, while LGAs like Kiama, Moro, and Ekiti remain almost entirely deprived.
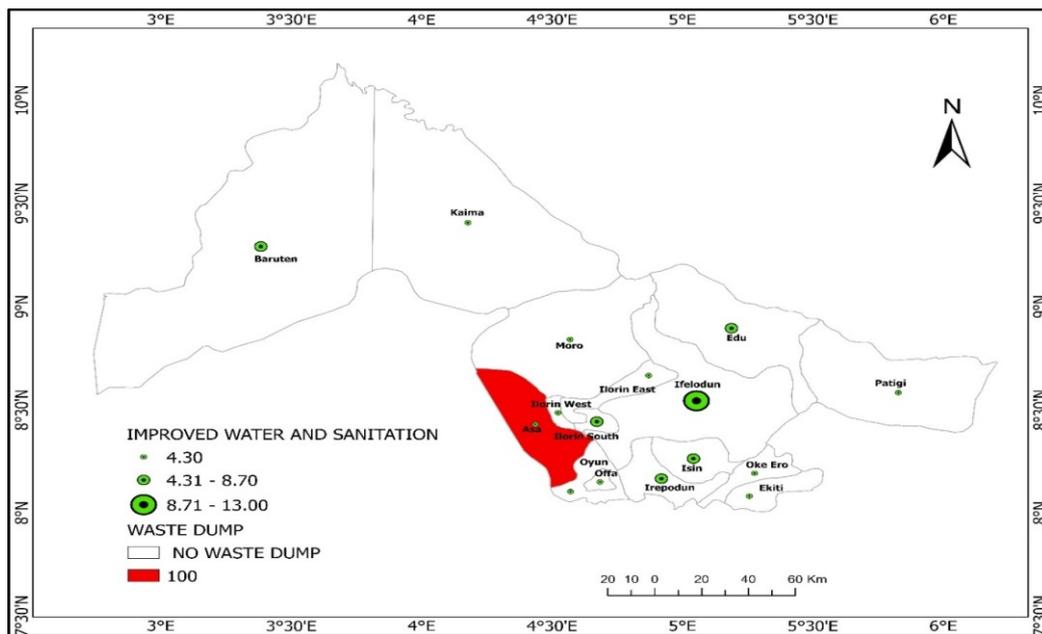
Figure 11: Pattern and distribution of improved water and sanitation, and waste dumpsite in the study area
Source: Secondary Data from Annual Abstract of Statistics, and Kwara State Emergency Management Agency (2024)

Table 2: Number of people affected by Flood and Fire attributes

LGA	FLOOD	% FLOOD	FIRE	% FIRE
Asa	641	17.2	61	11.2
Baruten	0	0.0	28	5.1
Edu	1094	29.4	18	3.3
Ekiti	0	0.0	0	0.0
Ifelodun	212	5.7	92	16.9
Ilorin East	113	3.0	94	17.3
Ilorin South	31	0.8	2	0.4
Ilorin West	0	0.0	4	0.7
Irepodun	189	5.1	31	5.7
Isin	38	1.0	2	0.4
Kaima	48	1.3	88	16.2
Moro	319	8.6	112	20.6
Offa	87	2.3	8	1.5
Oke Ero	0	0.0	0	0.0
Oyun	39	1.0	0	0.0
Patigi	914	24.5	4	0.7
	3725	100	544	100

Source: Researcher's computation 2024

Conclusion

This study has uncovered significant spatial disparities in the distribution of human security indicators across Kwara State, highlighting the urgent need for location-specific policy interventions. While Baruten stood out for its relative agricultural strength and food access, LGAs such as Ifelodun and Ilorin South faced pressing challenges in personal and health security, pointing to deep-rooted socio-economic vulnerabilities. Similarly, access to education, improved water, and sanitation remains highly uneven, reflecting infrastructural deficiencies that continue to hinder equitable human development.

The integration of Geographic Information Systems (GIS) proved instrumental in mapping these localized vulnerabilities, offering a replicable and data-driven framework for assessing and tracking human security over time and across space. This spatial approach enables policymakers to allocate resources more effectively, tailor development strategies to local realities, and monitor the impact of interventions with greater precision. Looking ahead, future research should incorporate temporal analyses and participatory GIS methods to deepen understanding, foster community engagement, and enhance local resilience to human security threats.

References

Abdulrasaq, A. (2018). *Suspects sold 31 human heads to some personalities*. Vanguard Newspapers, October 17.

Ajadi, B. S., and Adeniyi, A. (2017). Trends analysis of agricultural productivity in Kwara State, Nigeria. *Tetfund Sponsored Kwara State Polytechnic Journal of Research and Development Studies*, 5.

Ajisegiri, B., Andrés, L. A., Bhatt, S., Dasgupta, B., Echenique, J. A., Gething, P. W., Grabinsky Zabludovsky, J., and Joseph, G. (2019). Geo-spatial modeling of access to water and sanitation in Nigeria. Journal of Water, Sanitation and Hygiene for Development, 9(2), 258–280. https://doi.org/10.2166/washdev.2019.089

Akokpari, J. (2007). The Political Economy of Human Insecurity in Sub-Saharan Africa. Visiting Research Fellow Series No. 431, Institute for Developing Economies, Tokyo. Retrieved from https://open.uct.ac.za/items/daeaa27d-8ba1-4b8f-881e-005592247397

Alao, O. D., Mavalla, A. G., and Akinnusi, A. D. (2019). The Effects of Communal Clashes on Socio-Economic Development: A Study of Erin-Ile and Offa, Kwara State, Nigeria. The International Journal of Humanities & Social Studies, 7(7). https://doi.org/10.24940/ theijhss/2019/v7/i7/HS1904-021

Ani, C. J., Okoye, J. K., and Ifeanyi, C. A. (2021). Human security framework and development in Nigeria. *African Security Review*, *30*(1), 57–71.

Asfaw, A., and Tabitha, K. (2016). Human security assessment in Kenya: The case of Isiolo, Lakipia, Nandi and Elgeyo Marakwet counties. *Review of European Studies*, 8, 156. https://doi.org/10.5539/res.v8n3p156:contentReference{index=1}

Bajpai, K. (2000). Human security: Concept and measurement. Kroc Institute Occasional Paper No. 19. Joan B. Kroc Institute for International Peace Studies, University of Notre Dame.

Benhamza, Z., and Ghai, A. (2020). Personal security and urban vulnerability in Africa. *Global Crime*, *21*(1), 34–49.

Buhaug, H., & Lujala, P. (2005). Accounting for scale: Measuring geography in quantitative studies of civil war. *Political Geography*, *24*(4), 399–418. https://doi.org/10.1016/j.polgeo.2005.01.002

Buhaug, H., and Lujala, P. (2005). Accounting for scale: Measuring geography in quantitative studies of civil war. Political Geography, 24(4), 399–418. https://doi.org/10.1016/j.polgeo.2005.01.002

Chukwu, O. O., Okonkwo, N. C., and Adewale, S. M. (2017). Water accessibility and community health in Nigeria. Environmental Research Journal, 11(3), 123–136.

Food and Agriculture Organization (FAO). (2021). The state of food security and nutrition in the world 2021: Transforming food systems for food security, improved nutrition and affordable healthy diets for all. FAO, IFAD, UNICEF, WFP, and WHO. https://doi.org/10.4060/cb4474en

Gasper, D. (2013). Human security studies: The birth of a field. *International Journal of Peace Studies*, *18*(1), 17–34.

Gasper, D., and Gómez, O. A. (2022). The human security approach: Potentials and limits for advancing climate security. Sustainability Science, 17(2), 423–435. https://doi.org/10.1007/s11625-021-01043-0

Hampson, F. O., Daudelin, J., Hay, J. B., Reid, T., & Martin, H. (2002). *Madness in the multitude: Human security and world disorder*. Oxford University Press.

Ilesanmi, F. F., and Rotowa, O. O. (2020). Geospatial analysis of human security threats in Nigeria: Implications for sustainable development. Journal of Geographical Research, 3(2), 45–58.

Leaning, J., and Arie, S. (2000). Human security: A framework for assessment in conflict and transition. *Harvard Center for Population and Development Studies*

Li, J., Zhang, L., and Sun, Y. (2023). Mapping urban poverty using spatial indicators in Sub-Saharan Africa. GeoJournal, 88(1), 55–74.

Muhibbu-Din, M. (2020). Health insecurity and underdevelopment in Nigeria. *Journal of African Development Studies*, *15*(2), 88–103.

National Bureau of Statistics. (2018). National Literacy Survey 2018. Abuja, Nigeria: NBS. Retrieved from https://nigerianstat.gov.ng

Nazarova, E., Zaitseva, O., & Zhidkova, M. (2019). Integrated human development and security index: Methodology and application. *International Journal of Social Economics*, *46*(7), 889–904.

Okolie, A. M., and Nnamani, D. O. (2017). Fulani herders' militancy, environmental security, and sustainability of livelihood in Nigeria. *Studies in Politics and Society*, 5(1), 93–112.

Okunlola, T., and Oyeyemi, A. (2019). Access to improved water and sanitation in rural Nigeria. *Journal of Environmental Studies*, *45*(2), 133–145.

Orencio, P. M., Endo, A., Taniguchi, M., and Fujii, M. (2016). Using thresholds of severity to threats to and the resilience of human systems in measuring human security. *Social Indicators Research*, 129, 979–999.

Orhero, J. (2020). Human security: The key to enduring national security in Nigeria. *Journal of Public Administration, Finance and Law*, 17, 470–484.

Orire, I. O., and Ogunfolaji, D. (2021). Dimensions of human security and socio-economic development in Ilorin metropolis, Kwara State Nigeria. *Ghana Journal of Geography*, 13(3), 42–65. https://doi.org/

10.4314/gjg.v13i3.3:contentReference{index=6}

Owen, T. (2003). Human security Conflict, critique and consensus: Colloquium remarks and a proposal for a threshold-based definition. *Security Dialogue*, *35*(3), 373–387.

Owen, T., and Slaymaker, M. (2005). Toward a geographic approach to human security. *Global Environmental Change and Human Security Report*, *5*(1), 12–24.

Pradhan, K. P., Mishra, S., and Behera, B. K. (2018). GIS for human security: A tool for sustainable development. International Journal of Sustainable Development and Planning, 13(3), 395–406. https://doi.org/10.2495/SDP-V13-N3-395-406

Ramli, M. W. A., and Alias, N. E. (2024). Multidimensional vulnerability mapping using GIS and catastrophe theory. *International Journal of Geoinformatics, 20*(8), 1–16. https://doi.org/10.52939/ijg.v20i8.3443

Rummel, R. J. (2001). Testing whether freedom predicts human security and violence. *Paper presented at the Annual Meeting of the American Political Science Association*.

Ruzhytskyi, A. (2021). Economic security and stability in fragile states. *World Economics Journal*, *25*(3), 214–229.

Strǎchinaru, A. (2022). Early warning systems and food security in Africa. *International Journal of Development Studies*, *19*(4), 145–163.

UNDP. (1994). *Human Development Report 1994: New dimensions of human security*. New York: Oxford University Press.

Weisfeld, N. I., Lang, C., and Jorgensen, J. (2020). Spatial disparities and social inequalities. In Global Health and the Future Role of the United States (pp. 121–137). National Academies Press.

World Bank. (2021). Nigeria Development Update: Resilience through Reforms. Washington, D.C.: World Bank Group. Retrieved from