

A Space Base Technology Model for Assessing Governance and Security Index in Gombe State

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ABSTRACT

This study develops a Geospatial Governed and Ungoverned Space Index (GGUSI) to systematically identify and analyze governance deficits in Gombe and Taraba States, Nigeria. In response to persistent insecurity in the North-East and Middle Belt regions, the research leverages satellite remote sensing, Geographic Information Systems (GIS), and spatial datasets to quantify state presence and security coverage. The core hypothesis is that governance and security have measurable spatial expressions, shaped by physical terrain, infrastructure distribution, and accessibility. A multi-criteria weighted overlay analysis in ArcGIS integrated key indicators: terrain ruggedness and forest cover (weighted 0.3 each), settlements without security infrastructure (0.2), and settlements lacking schools and health facilities (0.1). Higher composite scores identified areas with pronounced ungoverned characteristics. Data sources included Landsat 9 imagery for land use/land cover classification, ACLED conflict data, and GRID3 datasets on settlements, social infrastructure, and security points. Results reveal distinct spatial patterns. In Gombe State, ungoverned spaces are driven primarily by security gaps and difficult terrain, with critical deficits in wards like Awak (Kaltungo LGA) lacking any police facility. Social infrastructure alone was a weaker predictor. The study concludes that physical geography and security infrastructure are the dominant drivers of ungoverned spaces in these regions. The GGUSI provides a spatially explicit, evidence-based tool for prioritizing security interventions, enhancing resource allocation, and strengthening governance in vulnerable areas. This geospatial approach aligns with national objectives for data-driven security planning and the effective utilization of Nigeria's space-based assets.

Received: 03 Aug. 2026

Accepted: 08 Sept. 2026

Published: 15 Sept. 2026

Keywords: GIS, Remote Sensing, GGUSI, ArcGIS

INTRODUCTION

In the contemporary security landscape, states face increasingly complex threats that transcend conventional boundaries and challenge traditional governance models. One of the most critical manifestations of this challenge is the existence of ungoverned or weakly governed spaces, areas where state authority is minimal, governance institutions are ineffective, and security provision is inconsistent (Clunan & Trinkunas, 2010). Such spaces often provide operational environments for insurgents, bandits, and other non-state armed groups.

In Nigeria, particularly within the North-Eastern and Middle Belt regions, insecurity has taken the form of insurgency, communal conflicts, banditry, and transnational criminal activities. These challenges have exposed significant spatial disparities in governance and security coverage across sub-national units (Adeyemi, 2021). Conventional administrative boundaries and descriptive security reports often fail to capture these disparities in a spatially explicit manner. Consequently, there is a growing need for geospatially driven tools that can systematically identify, monitor, and index governed and ungoverned spaces. This research proposes the development of a Geospatial Governed and Ungoverned Space Index (GGUSI) for Gombe using space-based technologies such as satellite remote sensing, Geographic Information Systems (GIS), and geospatial intelligence (GEOINT) (Campbell & Wynne, 2011; Longley et al., 2015). Globally, geospatial and space-based technologies have become central to modern security management, supporting border surveillance, counter-terrorism operations, and

disaster risk reduction (Goodchild, 2007). In Nigeria, investments in national satellite systems such as NigeriaSat and NigComSat reflect growing recognition of the strategic importance of space technology for national security and development (NASRDA, 2020). However, the integration of these datasets into structured spatial governance and security assessment frameworks remains limited.

The underlying assumption of this research is that governance and security presence have spatial expressions that can be quantified through geospatial indicators. Indicators such as accessibility, terrain ruggedness, forest cover, proximity to security infrastructure, and availability of social services can be integrated within a GIS environment to distinguish governed from ungoverned spaces (UNOOSA, 2021). Gombe States present suitable case studies due to their heterogeneous terrain, dispersed rural settlements, and exposure to communal and armed conflicts. This research therefore seeks to bridge this gap by developing a Geospatial Governed and Ungoverned Space Index that supports evidence-based security planning and intervention. By leveraging space-based geospatial technologies, the study aims to enhance situational awareness, improve spatial decision-making, and contribute to strengthened security governance in Gombe States.

Ungoverned spaces are territories where state institutions lack the capacity or legitimacy to exercise authority. Scholars identify these spaces as outcomes of governance failure, spatial marginalization, and environmental constraints. In the African and Nigerian context, ungoverned spaces are often associated with remote rural areas, forests, mountainous

terrain, borderlands, and regions with poor accessibility, where environmental constraints, socio-economic marginalisation, and weak institutions combine to limit effective state control (Onuoha, 2020; Okoli & Lenshie, 2018).

In the Nigerian context, governance dynamics are closely intertwined with physical accessibility, as the ability of the state to exercise authority, deliver services, and maintain security is strongly influenced by spatial reach. This study conceptualizes governance dynamics as a function of accessibility to administrative centers, security infrastructure, road networks, and settlements. Areas characterized by poor road connectivity, long travel times, and difficult terrain tend to experience reduced government presence and limited institutional effectiveness, thereby creating conditions conducive to ungoverned spaces. Using GIS, accessibility indicators such as distance-to-road, distance-to-settlement, and travel-time surfaces are generated and employed as proxies for governance reach. This approach reflects empirical findings in Nigeria, where spatial isolation has been shown to significantly constrain security operations, public service delivery, and state legitimacy, particularly in rural, forested, and border regions (Onuoha, 2016; Okoli & Lenshie, 2018; Adelaja et al., 2018). By integrating governance dynamics with accessibility analysis, the study provides a spatially explicit method for assessing governance deficits across the study area.

The drivers and enabling conditions of ungoverned spaces in Nigeria are captured through a combination of environmental, infrastructural, and socio-spatial indicators. Rugged terrain and slope, derived from Digital Elevation Models (DEM), represent physical barriers to surveillance and mobility, while land use and land cover data indicate vegetation density and concealment potential. Infrastructural variables, including road density and settlement distribution, reflect levels of state penetration and economic integration. These factors, when combined, model the conditions that enable the persistence of ungoverned spaces in Nigeria, particularly in regions affected by insurgency, banditry, and communal conflict (Ahmed et al., 2019; Onuoha & Ezirim, 2013).

Persistent and evolving security challenges in Nigeria, particularly in North-Eastern Nigeria and the Middle Belt, are increasingly shaped by spatial factors such as terrain, infrastructure distribution, and accessibility. Despite the presence of security forces and governance structures, many areas remain weakly governed or ungoverned, creating opportunities for non-state actors to operate. In Gombe State, existing security assessments rely largely on qualitative and administrative approaches that lack spatial precision and predictive capability. Furthermore, although Nigeria possesses geospatial and space-based technologies, these have not been effectively integrated into a standardized framework for analyzing governance and security presence. Consequently, there is no quantitative geospatial index to systematically identify and map governed and ungoverned spaces, limiting evidence-based decision-making, early warning, and targeted security interventions.

This study is justified by its academic, practical, and policy relevance. Academically, it advances research on ungoverned spaces by introducing a quantitative, geospatial index that integrates security analysis with space-based technologies, strengthening interdisciplinary knowledge. Practically, it provides a spatial decision-support tool for identifying governance gaps and security hotspots, thereby improving planning and resource allocation in Gombe State. From a policy perspective, the study supports data-driven security planning and the effective use of national geospatial assets, contributing to enhanced governance, targeted interventions, and reduced vulnerability in conflict-prone areas.

From a policy perspective, the research aligns with national objectives on internal security, space technology utilization, and data-driven governance. It supports the effective use of Nigeria's space-based assets and promotes evidence-based security interventions at sub-national levels. Ultimately, the findings of this study are expected to contribute to improved security governance, reduced vulnerability of ungoverned spaces, and strengthened state presence in conflict-prone regions. To spatially map and analyze governed and ungoverned spaces in Gombe States using geospatial techniques, integrating social infrastructure, security coverage, physical terrain, and land use/land cover data to support governance planning, security deployment, and equitable service delivery. The objectives these research were to identify and map the spatial distribution of social infrastructure and density of schools and health facilities across settlement in Gombe States as indicators of state presence and governance, to assess security infrastructure coverage to determine areas with limited or absent formal security presence, highlighting potential ungoverned spaces in Gombe States, to analyze the influence of physical and environmental factors and how terrain (slope, ruggedness), forest cover, and land use/land cover classes contribute to governance deficits and ungoverned space characteristics and to classify governed and ungoverned spaces using geospatial analysis incorporating slope, forest cover, settlements without security coverage, and settlements lacking schools and health facilities to generate a governance index in Gombe States.

MATERIAL AND METHODS

Methodology

This study employed an integrated geospatial approach to map and analyze governed and ungoverned spaces in Gombe States, northeastern Nigeria. The analysis combined physical, environmental, security, and socio-infrastructural indicators to assess spatial variations in governance and state presence.

Data Sources

The study utilized multispectral satellite imagery (Landsat 9, 2025) for Land Use/Land Cover (LULC) classification; Armed Conflict Location and Event Data (ACLED) to capture spatial patterns of insecurity; geospatial datasets of infrastructure and services including schools, health facilities, police stations, , and courts; settlement polygon data representing population distribution were obtained from GRID-3.

Table 1: Data Source and Types

Data Type	Purpose in Analysis	Source
Satellite Imagery	Land Use/Land Cover classification	USGS Earth Explorer
Conflict and Insecurity Data	Identification of insecurity hotspots	ACLED
Education Infrastructure	Assessment of educational services	GRID3 / State Ministries of Education
Health Infrastructure	Evaluation of healthcare accessibility	GRID3 / State Ministries of Health
Security Infrastructure	Assessment of formal security presence	Nigeria Police Force / GRID3

Data Type	Purpose in Analysis	Source
Settlement Data	Analysis of settlement distribution	GRID3
Terrain Data	Derivation of slope and terrain	USGS / SRTM
Administrative Boundaries	Spatial governance analysis	Office of the Surveyor-General / GRID3

Data Processing and Analysis

All datasets were harmonized to a common coordinate system and clipped to the study area. Satellite imagery was preprocessed through atmospheric correction and cloud masking before supervised LULC classification into vegetation, farmland, bare surface, settlement, and waterbody classes. DEM data were processed to derive slope, while road network analysis was used to assess settlement accessibility. The security implications and development of ungoverned spaces are examined through spatial overlay of ungoverned space outputs with infrastructure distribution and reported insecurity patterns. GIS-based analysis allows for the identification of spatial convergence between governance deficits, underdevelopment, and insecurity. In Nigeria, studies have demonstrated that areas with weak governance presence often experience lower infrastructure investment and higher exposure to violent conflict and criminal activity. This reinforces the interpretation of ungoverned spaces as spatial manifestations of both security vulnerability and development exclusion (Adelaja et al., 2018; Okoli & Orinya, 2014).

Conflict and crime hotspot mapping is employed as a complementary analytical and validation tool. It extends beyond spatial concentration to examine the underlying spatial drivers of violence. Where available, geo-referenced incident data are analyzed using spatial clustering techniques to identify concentrations of criminal and violent activities. In Nigeria, GIS-based hotspot mapping has been effectively used to reveal spatial relationships between insecurity, terrain characteristics, and accessibility constraints, thereby strengthening the empirical linkage between ungoverned spaces and security outcomes (Okoli and Ugwu, 2019). By integrating conflict event data with environmental and infrastructural layers, GIS analysis reveals how violence in Nigeria is often concentrated around forests, grazing corridors, border areas, and remote rural zones. This approach supports early-warning analysis and strategic planning by identifying structurally vulnerable locations prone to recurrent conflict (Adelaja & George, 2019; Higazi, 2019). Spatial distribution and analyses were conducted for social and security infrastructure at ward level. Infrastructure-to-settlement ratios were computed to evaluate the adequacy of service provision, and wards with settlements but limited or absent infrastructure were identified as weakly governed spaces. ACLED conflict data were overlaid on settlement and infrastructure layers to identify insecurity hotspots and

examine their spatial relationship with governance deficits. Euclidean distance was applied in ArcGIS to assess spatial accessibility of settlements to key governance and security infrastructure and to strengthen the identification of governed and ungoverned spaces using the Euclidean Distance tool in ArcGIS Spatial Analyst, continuous distance surfaces were generated to measure straight-line distances from each settlement to the nearest facility of each infrastructure type. Ungoverned spaces are delineated using a GIS-based multi-criteria evaluation framework. Indicators including terrain ruggedness, vegetation cover, settlement density, and accessibility to road networks are standardized and integrated using weighted overlay analysis. This approach enables objective identification of areas with high physical inaccessibility and low governance presence. In the Nigerian context, such spatial delineation is particularly relevant for identifying forest reserves, mountainous regions, and borderlands that have historically served as governance-challenged zones (Higazi, 2019; Onuoha, 2016). Weighted overlay analysis was applied in ArcGIS, combining multiple geospatial indicators such as slope, proximity to schools, health facilities, and security points, as well as density of settlements using a weighted sum model integrating key physical and social indicators, where forest cover and slope were each assigned a weight of 0.3, spatial distribution of settlements without security coverage was weighted 0.2, and settlements lacking schools and health facilities were weighted 0.1. Higher composite scores indicate stronger ungoverned space characteristics, while lower scores reflect better governance and state presence allowing the index to quantify the degree to which a location is governed or ungoverned. The resulting index were visualized as a continuous raster map, highlighting zones of strong governance, and ungoverned areas across Gombe.

RESULTS AND DISCUSSION

This technical analysis examines ungoverned spaces in Gombe State through the spatial assessment of ward-level distribution of infrastructural data (schools, health facilities), and settlements (Figure1). Ungoverned spaces are identified as areas where state presence is weak or absent, particularly where critical social infrastructure such as education and healthcare facilities are lacking. The assessment aligns with Nigeria's National Security Strategy (NSS) and National Development Plan (NDP), which emphasize inclusive service delivery, human security, and equitable development.

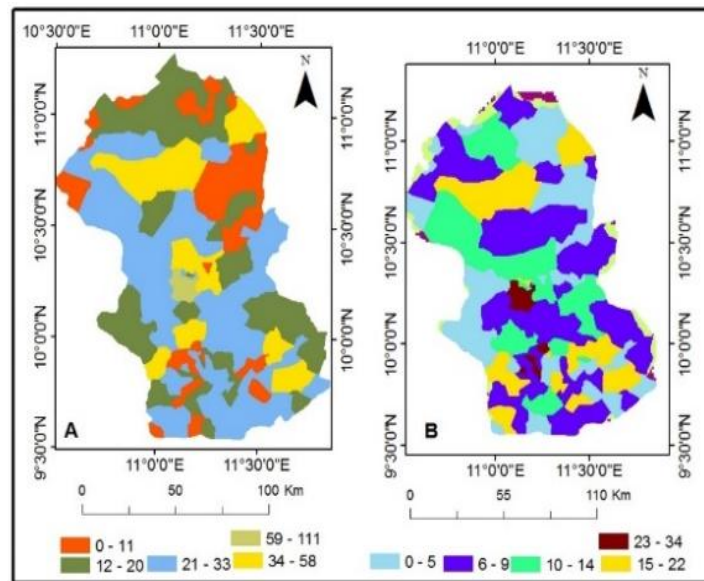


Figure 1: Spatial Concentration of School (A) and Health (B) Facilities

The findings indicate that while most wards in Gombe State have some degree of institutional presence, critical infrastructure gaps exist in selected locations. Nasarawa Ward in Gombe LGA exhibits the most severe ungoverned characteristics, with a complete absence of both schools and health facilities. Bolari East Ward lacks schools, while Herwa Gana and Dawaki Wards show total absence of health facilities (index 1). Similarly, Bule/Kaltin and Yiri Wards in Kaltungo LGA demonstrate weak health service coverage despite existing settlements. Areas with absent or inadequate social infrastructure are vulnerable to insecurity, social

exclusion, and non-state actor influence. Lack of schools and health facilities undermines human security, weakens community resilience, and constrains early warning and response mechanisms. Through the lens of National Development Plan perspective which underscores equitable access to education and healthcare as a foundation for sustainable growth, wards identified as ungoverned spaces risk persistent poverty, poor health outcomes, and low human capital development if targeted interventions are not implemented.

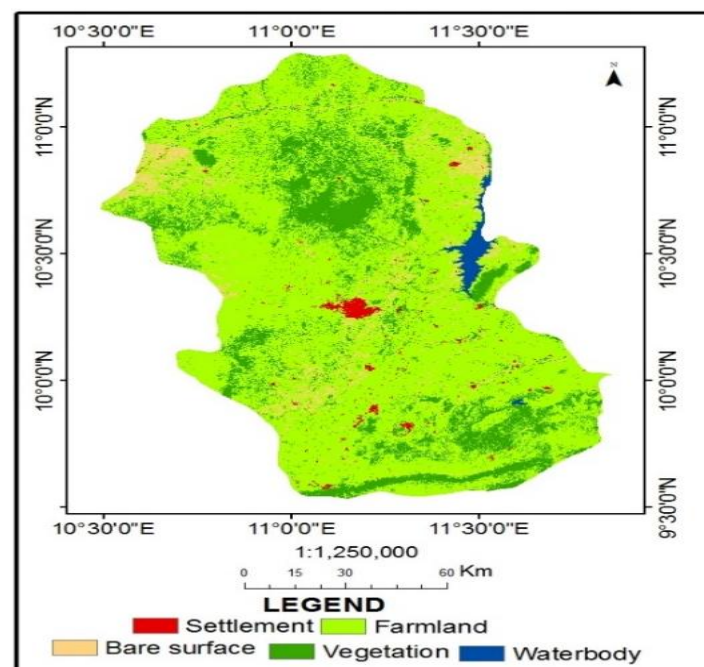


Figure 2: Land Use Land Cover Image of Gomber State

Ungoverned spaces in Gombe State through the lens of security infrastructure, the analysis revealed conflict events are spatially clustered across several wards and LGAs in Gombe State, with high concentrations in Gombe, Kaltungo, Billiri, Funakaye, Akko, Dukku, Balanga, Nafada, Yamaltu,

and Shongom LGAs (index 2), indicating varying degrees of governance presence. The repeated occurrence of armed clashes, attacks, and abductions in locations such as Gombe metropolis, Kaltungo, Billiri, Ashaka, Bajoga, Kumo, Dukku, and Dadin Kowa (figure 1) demonstrates persistent insecurity.

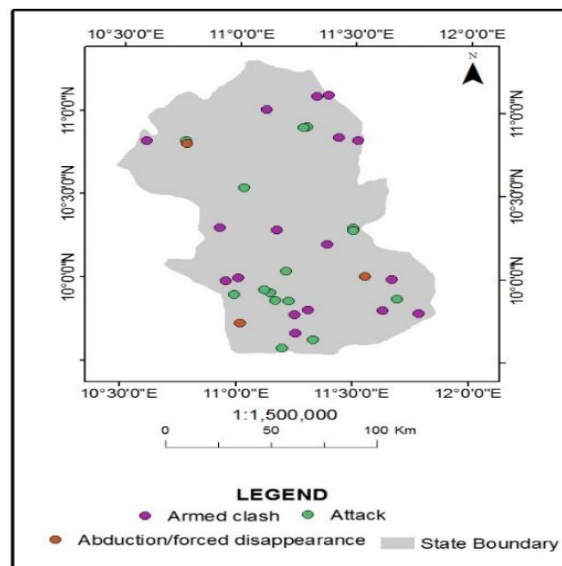


Figure 3: Spatial Distribution of Conflict Incidences in Gombe State

Moreover, Areas recording high conflict counts (index 3) across the wards, notably in Funakaye LGA (Ashaka and Bajoga) and Gombe LGA, reflect locations where the concentration of incidents has triggered stronger security presence and control measures, which in turn contribute to the gradual containment and reduction of conflict occurrences over time. Similarly, repeated incidents in Kaltungo, Balanga

(Tallase and Nyuwar), Dukku, Akko (Kumo), Billiri, and Nafada LGAs (Figure 4 below) highlight insecurity hotspots where enhanced surveillance and security interventions have been spatially deployed to minimize further escalation. Conversely, locations with low or zero recorded conflict counts including parts of Yamaltu, Kwami, Shomgom, Nafada, and selected wards in Billiri and Akko.

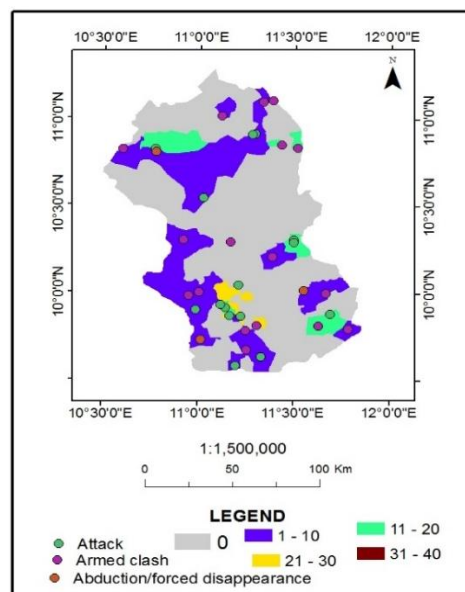


Figure 4: Spatial Concentration of Conflict Incidence in Gombe State

In Gombe LGA (figure 4), strong security governance is evident. Ajiya Ward, hosting the State Headquarters of the Nigerian Police Force, represents the highest level of security presence and control. Shamaki Ward, with the Gombe Area Command, and Jekadafari and Bolari West Wards, each served by Divisional Police Stations, demonstrate robust institutional coverage, significantly reducing ungoverned space risks despite dense settlement patterns. In Yamaltu/Deba LGA, security presence is uneven. Hinna Ward hosts both the Shinga Police Outpost and the Dadin Kowa Police Division, indicating improved coverage;

however, reliance on outposts suggests limited operational reach across dispersed settlements. Kwadon/Liji/Kurba Ward and Lubo/Difa/Kinafa Ward are served only by police outposts, which may be insufficient for effective surveillance and rapid response across multiple settlements. Zambuk/Kwali Ward, with a full Police Station, shows stronger security control relative to surrounding wards. In Kaltungo LGA, Awak Ward is identified as a critical ungoverned space, as it has no police outpost (Nil) despite the presence of settlements, indicating a complete absence of formal security infrastructure. Wange Ward, hosting both a

Police Station and the Divisional Headquarters in Tula, provides stronger security coverage and functions as a policing hub for surrounding areas. In Funakaye LGA, Tongo

Ward and Bage Ward are covered by a Police Outpost respectively.

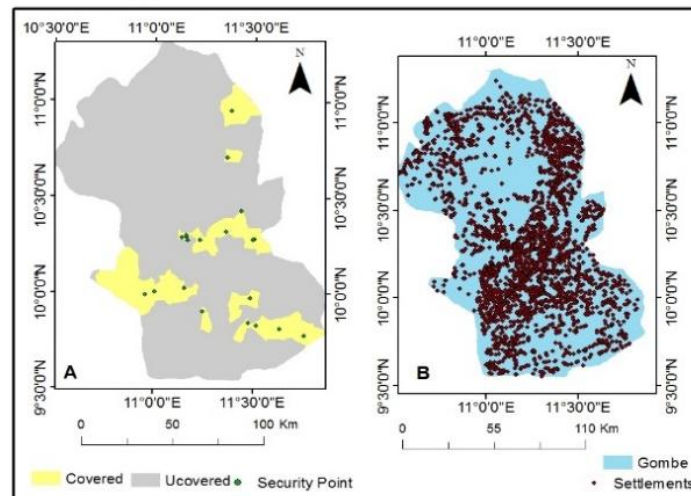


Figure 5: Spatial Distribution of Security Point (A) and Settlement (B)

While these provide some security presence, their limited capacity and temporary nature suggest reduced effectiveness in managing settlement-wide security challenges, thereby contributing to partial ungoverned space conditions. In Shomgom LGA, Kulishin Ward is served by the Lau Iyaka Police Outpost, indicating minimal security presence across settlements and a higher vulnerability to ungoverned conditions due to limited enforcement reach. In Akko LGA, relatively stronger security coverage exists. Kumo West, Tumu, and Pindiga Wards each host full Police Stations, indicating improved security governance across settlement clusters. These wards show reduced likelihood of ungoverned spaces compared to those served only by outposts. In Balanga LGA, Degri Ward and Nyuwar/Jessu Ward are each served by Police Stations, suggesting moderate to strong security presence capable of supporting settlement safety and governance.

Wards with no police facility or only outposts face increased risks of ungoverned space characteristics, including delayed response times, weak intelligence gathering, and limited deterrence against criminal or non-state actor activities. The absence of a police post in Awak Ward represents the most severe security gap, while wards dependent on outposts face partial governance deficits, particularly where settlements are numerous or spatially dispersed. Ungoverned spaces from a security perspective in Gombe State are localized and infrastructure-driven. The most critical ungoverned condition is observed in Awak Ward (Kaltungo LGA) due to the complete absence of a police facility. Wards relying solely on police outposts such as Kulishin, Tongo, Bage, Kwadon/Liji/Kurba, and Lubo/Difa/Kinafa exhibit partial ungoverned characteristics. In contrast, wards hosting Police Stations, Divisional Headquarters, Area Commands, and the State Headquarters demonstrate strong security governance and reduced vulnerability.

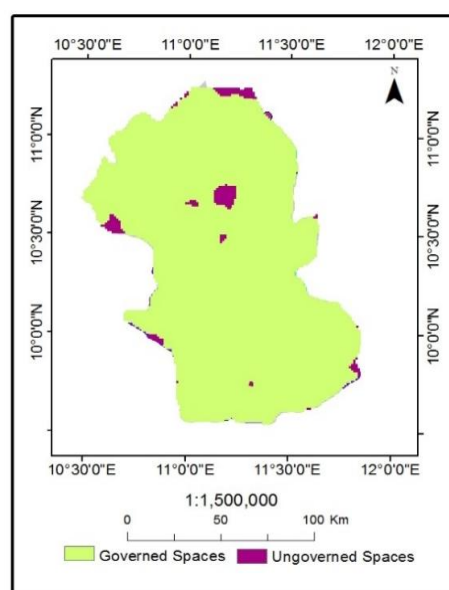


Figure 6: Ungoverned Spaces Risk Index of Gombe State

Across the state, areas characterized by dense forest cover and rugged terrain significantly contribute to ungoverned space conditions due to limited accessibility and reduced state surveillance, making these factors the dominant drivers in the spatial model (Figure 6). Settlements located within such terrains, particularly where formal security infrastructure is absent, further amplify governance deficits.

In Kwami LGA, Gadam Ward exhibits elevated ungoverned space characteristics under the weighted model due to the combined influence of moderate forest cover, challenging terrain, dispersed settlements, and limited proximity to security infrastructure, despite the presence of basic social services. Similarly, Bojude Ward reflects partial ungoverned conditions, where settlement dispersion and physical terrain outweigh available infrastructure, resulting in moderate governance deficits. In Dukku LGA, wards surrounding the Wawa–Zange grazing reserve axis, which is frequently associated with farmer–herder conflicts record high ungoverned space scores this is primarily driven by the concentration of settlements without adequate security coverage (0.2 weight combined with open forested corridors and gentle slopes that facilitate unrestricted movement of armed groups and migrating herders. Although schools and health facilities exist in some of these wards, their lower weight (0.1) limits their ability to offset security and terrain-related risks. Conversely, wards with lower forest density, gentle slopes, consistent security presence, and adequate coverage of schools and health facilities demonstrate lower weighted scores and are classified as governed spaces reflecting stronger state control, improved service delivery, and reduced conflict vulnerability.

In summary, the weighted sum analysis indicates that ungoverned spaces in Gombe State are primarily driven by physical geography (forest and slope) and security gaps, rather than social infrastructure alone. Gadam and Bojude Wards in Kwami LGA, as well as conflict-prone wards in Dukku LGA around Wawa–Zange, emerge as priority areas for intervention, where improving security coverage, regulating land use, and managing forest corridors would significantly reduce ungoverned space characteristics and associated conflicts.

CONCLUSION

This study developed a Geospatial Governed and Ungoverned Space Index (GGUSI) to systematically map and analyze governance and security deficits in Gombe State. The findings demonstrate that ungoverned spaces are not randomly

distributed but are strongly influenced by spatial factors, particularly terrain ruggedness, forest cover, accessibility constraints, and the distribution of security infrastructure. The weighted overlay analysis revealed that physical geography and gaps in formal security presence are the most significant drivers of governance deficits, while social infrastructure alone plays a comparatively lesser role.

The study further shows that areas with limited accessibility, dense vegetation, and inadequate security coverage are more susceptible to insecurity and reduced state control. By integrating remote sensing, GIS, and spatial datasets, the GGUSI provides a robust, evidence-based framework for identifying governance gaps and prioritizing intervention areas. The results underscore the importance of adopting geospatial approaches in security planning, moving beyond traditional administrative and qualitative assessments toward spatially explicit and predictive models.

RECOMMENDATION

Geospatial intelligence should be institutionalized within State Governors' Security Councils, the Nigeria Police Force, and the Nigeria Security and Civil Defense Corps (NSCDC), with dedicated units equipped with automated Ungoverned Space Index (USI) dashboards updated quarterly using satellite data such as Nigsat, Sentinel-2 and PALSAR-2. Strategic investments should be prioritised in road surfacing, expansion of mobile network coverage, and the establishment of solar-powered Forward Operating Bases along high-risk corridors, particularly in border areas of south-eastern escarpment of Gombe State (Kaltungo and Balanga).

In addition, fixed-wing UAVs and long-range drone patrols should be deployed and programmed using USI spatial layers to enable real-time surveillance, supported by change-detection systems for monitoring activities such as illegal logging, cattle rustling, and unauthorized mass gatherings. The USI framework should also be integrated into state-level Medium-Term Development Plans to guide the strategic siting of schools, primary healthcare centres, and agro-processing facilities in high-risk areas, thereby transforming ungoverned spaces into governable zones through improved service delivery. Furthermore, a quarterly tri-state security forum involving Taraba State, Gombe State, and Adamawa State should be established and co-chaired by the Directors of State Services and Geographic Information Agencies, using shared geospatial datasets to coordinate joint operations, enforce grazing routes, and strengthen transboundary early-warning systems.

Appendix 1: School and Health Facilities in Gombe State

S/N	LGA Name	Ward Name	No. of Schools	No. of Health Facilities	No. of Settlements
1	Gombe	Bolari West	18	10	2
2	Gombe	Herwa Gana	5	0	1
3	Gombe	Pantami	33	10	6
4	Gombe	Jekadafari	19	10	4
5	Gombe	Kumbiya Kumbiya	1	2	2
6	Funakaye	Bajoga West	11	4	15
7	Yamaltu/Deba	Kanawa / Wajari	19	6	33
8	Balanga	Bambam	25	8	13
9	Billiri	Tanglang	18	6	6
10	Dukku	Wuro Tale	15	9	21
11	Billiri	Tudu Kwaya	14	7	16
12	Yamaltu/Deba	Lubo / Difa / Kinafa	18	6	28
13	Akko	Akko	27	4	52
14	Balanga	Degri	47	17	26

S/N	LGA Name	Ward Name	No. of Schools	No. of Health Facilities	No. of Settlements
15	Karim Lamido	Bikwin	32	19	17
16	Karim Lamido	Jen Kaigama	17	8	15
17	Karim Lamido	Bachama	16	18	19
18	Kwami	Bojude	16	6	21
19	Gombe	Dawaki	2	0	4
20	Gombe	Bolari East	0	1	3
21	Gombe	Nasarawo	0	0	1
22	Akko	Kashere	37	15	57
23	Nafada	Nafada West	5	3	5
24	Akko	Kumo North	18	6	55
25	Kaltungo	Bule / Kaltin	5	0	7
26	Kwami	Kwami	47	13	62
27	Nafada	Jigawa	16	8	19
28	Dukku	Hashidu	7	3	7
29	Kaltungo	Tungo	13	5	9
30	Nafada	Nafada East	11	2	11
31	Kaltungo	Kaltungo West	33	16	7
32	Billiri	Banganje North	10	5	13
33	Kaltungo	Wange	25	7	8
34	Balanga	Gelengu	47	20	33
35	Kaltungo	Yiri	3	1	5
36	Balanga	Dadiya	24	7	14
37	Dukku	Zaune	7	3	20
38	Balanga	Mona	26	3	26
39	Yamaltu/Deba	Nono / Kunuwal / Wuro Birdeka	22	9	48
40	Shomgom	Kushi	11	4	7
41	Akko	Kumo East	32	9	159
42	Nafada	Birin Fulani West	17	5	31
43	Funakaye	Bajoga East	15	5	21
44	Shomgom	Gwandum	27	18	36
45	Yamaltu/Deba	Jagali North	15	7	41
46	Billiri	Billiri South	33	28	31
47	Yamaltu/Deba	Gwani / Shinga / Wade	27	8	111
48	Shomgom	Filiya	28	9	21
49	Nafada	Barwo Nasarawo	13	4	16
50	Billiri	Tal	22	15	22
51	Shomgom	Boh	12	7	6
52	Kwami	Komfulata	22	11	61
53	Akko	Kumo West	39	14	49
54	Nafada	Birin Bolawa	22	7	27
55	Funakaye	Bage	44	19	92
56	Kwami	Gadam	21	6	43
57	Akko	Tukulma	21	9	79
58	Funakaye	Wawa / Wakkaltu	6	1	25
59	Billiri	Bare	13	9	7
60	Kwami	Doho	23	11	37
61	Kaltungo	Baule Central	10	2	5
62	Gombe	Ajiya	26	10	9
63	Dukku	Malala	18	6	23
64	Balanga	Nyuwar / Jessu	26	4	13
65	Yamaltu/Deba	Lano / Kuri / Lambam	18	11	39
66	Akko	Garko	111	34	78
67	Kaltungo	Kamo	21	12	41
68	Dukku	Kunde	10	4	26
69	Billiri	Todi	8	6	28
70	Shomgom	Lapan	22	11	16
71	Kaltungo	Kaltungo East	24	17	11
72	Dukku	Waziri South	58	15	68

S/N	LGA Name	Ward Name	No. of Schools	No. of Health Facilities	No. of Settlements
73	Kwami	Malam Sidi	14	10	26
74	Akko	Kumo Central	36	7	29
75	Kaltungo	Ture	18	7	10
76	Akko	Pindiga	19	5	61
77	Funakaye	Tongo	9	5	18
78	Balanga	Bangu	17	9	18
79	Dukku	Zange	26	12	80
80	Funakaye	Ribadu	9	9	57
81	Yamaltu/Deba	Zambuk / Kwali	20	5	51
82	Shomgom	Lalaipido	16	11	18
83	Funakaye	Tilde / Bodor	6	3	21
84	Funakaye	Ashaka / Magaba	11	7	16
85	Shomgom	Kulishin	21	5	7
86	Yamaltu/Deba	Kwadon / Liji / Kurba	56	11	54
87	Nafada	Birin Fulani East	14	4	24
88	Yamaltu/Deba	Jagali South	17	8	30
89	Shomgom	Gundale	6	5	5
90	Funakaye	Kupto	9	3	31
91	Kwami	Malleri	5	4	18
92	Billiri	Billiri North	9	6	13
93	Funakaye	Jillahi	9	5	40
94	Gombe	Shamaki	55	17	14
95	Nafada	Gudukku	7	4	15
96	Kwami	Jurara	5	3	10
97	Yamaltu/Deba	Hinna	32	13	21
98	Shomgom	Burak	12	4	9
99	Billiri	Kalmai	11	7	11
100	Dukku	Lafiya Tale	7	3	90
101	Yamaltu/Deba	Deba	30	10	84
102	Akko	Tumu	29	10	77
103	Shomgom	Bangunji	24	6	26
104	Billiri	Banganje South	9	8	4
105	Dukku	Gombe Abba	21	6	31
106	Nafada	Barwo Winde	10	2	12
107	Kwami	Daban Fulani	8	6	15
108	Dukku	Jamari	20	11	92
109	Kaltungo	Awak	33	16	39
110	Gombe	Bajoga	22	6	8
111	Balanga	Swa	17	8	26
112	Akko	Kalshingi	22	6	81
113	Dukku	Waziri North	29	9	52
114	Balanga	Talasse	21	5	16
115	Kwami	Dukul	15	9	59
116	Nafada	Nafada Central	15	3	22
117	Balanga	Kindiyo	20	9	9

Appendix 2: Spatial Distribution of Insecurity Incidences in Gombe State

S/N	State	LGA	Location	Type of Conflict
1	Gombe	Yamaltu	Deba Kowa	Attack
2	Gombe	Yamaltu	Deba Kowa	Attack
3	Gombe	Yamaltu	Hinna	Attack
6	Gombe	Gombe	Gombe	Attack
7	Gombe	Funakaye	Ashaka	Armed clash
8	Gombe	Gombe	Gombe	Armed clash
9	Gombe	Gombe	Gombe	Attack
10	Gombe	Gombe	Gombe	Attack
11	Gombe	Kaltungo	Kaltungo	Armed clash
12	Gombe	Kaltungo	Kaltungo	Armed clash

S/N	State	LGA	Location	Type of Conflict
13	Gombe	Kaltungo	Kaltungo	Armed clash
14	Gombe	Kaltungo	Kaltungo	Armed clash
15	Gombe	Shomgom	Shongom	Armed clash
16	Gombe	Billiri	Kalmai	Attack
17	Gombe	Billiri	Kalmai	Attack
18	Gombe	Shomgom	Kushi	Attack
19	Gombe	Billiri	Billiri	Attack
20	Gombe	Billiri	Polapindi	Attack
21	Gombe	Yamaltu	Deba Habe	Armed clash
22	Gombe	Nafada	Bir Balawa	Attack
23	Gombe	Nafada	Biri Filani	Attack
24	Gombe	Dukku	Dukku	Attack
25	Gombe	Nafada	Nafada	Attack
26	Gombe	Gombe	Gombe	Abduction/forced disappearance
27	Gombe	Gombe	Gombe	Armed clash
28	Gombe	Dukku	Bolari	Armed clash
29	Gombe	Gombe	Gombe	Attack
30	Gombe	Kaltungo	Kaltungo	Armed clash
31	Gombe	Billiri	Billiri	Armed clash
32	Gombe	Billiri	Billiri	Armed clash
33	Gombe	Balanga	Nyuwar	Armed clash
34	Gombe	Balanga	Baianga	Armed clash
35	Bauchi	Darazo	Gombe Aba	Armed clash
36	Gombe	Dukku	Dukku	Armed clash
37	Gombe	Gombe	Gombe	Armed clash
38	Gombe	Dukku	Bolari	Armed clash
39	Gombe	Funakaye	Ashaka	Armed clash
40	Gombe	Funakaye	Bajoga	Armed clash
41	Gombe	Funakaye	Ashaka	Armed clash
42	Gombe	Nafada	Nafada	Armed clash
43	Gombe	Funakaye	Ashaka	Armed clash
44	Gombe	Gombe	Gombe	Armed clash
45	Gombe	Gombe	Gombe	Armed clash
46	Gombe	Gombe	Gombe	Armed clash
47	Gombe	Balanga	Wala Waja	Armed clash
48	Gombe	Gombe	Gombe	Armed clash
49	Gombe	Balanga	Baianga	Abduction/forced disappearance
50	Gombe	Akko	Kumo	Armed clash
51	Gombe	Akko	Tumu	Armed clash
52	Yobe	Fika	Ngalda	Armed clash
53	Gombe	Gombe	Gombe	Armed clash
54	Gombe	Gombe	Gombe	Armed clash
55	Gombe	Gombe	Gombe	Armed clash
56	Gombe	Gombe	Gombe	Armed clash
57	Gombe	Gombe	Gombe	Armed clash
58	Gombe	Akko	Kumo	Armed clash
59	Gombe	Gombe	Gombe	Armed clash
60	Gombe	Gombe	Gombe	Armed clash
61	Gombe	Gombe	Gombe	Armed clash
62	Gombe	Gombe	Gombe	Armed clash
63	Gombe	Akko	Lawanti	Armed clash
64	Gombe	Dukku	Dukku	Attack
65	Gombe	Gombe	Gombe	Attack
66	Gombe	Kwami	Bojude	Attack
67	Gombe	Gombe	Gombe	Attack
68	Gombe	Gombe	Gombe	Armed clash
69	Gombe	Billiri	Billiri	Armed clash
70	Gombe	Shomgom	Chongwom	Armed clash
71	Gombe	Akko	Kumo	Abduction/forced disappearance

S/N	State	LGA	Location	Type of Conflict
72	Gombe	Balanga	Degri	Attack
73	Gombe	Gombe	Gombe	Attack
74	Gombe	Dukku	Shabiwa	Abduction/forced disappearance
75	Gombe	Akko	Tudun Wada	Attack
76	Gombe	Billiri	Tudun Kwaya	Abduction/forced disappearance
77	Gombe	Billiri	Pobawure	Attack
78	Gombe	Billiri	Billiri	Attack
79	Gombe	Billiri	Billiri	Attack
80	Gombe	Shomgom	Kushi	Attack
81	Gombe	Akko	Kumo	Attack
82	Gombe	Akko	Pindiga	Armed clash
83	Gombe	Shomgom	Bangunji	Attack
84	Gombe	Gombe	Gombe	Attack
85	Gombe	Akko	Kumo	Attack
86	Gombe	Gombe	Gombe	Attack
87	Gombe	Gombe	Gombe	Armed clash
88	Gombe	Gombe	Gombe	Attack
89	Gombe	Funakaye	Bajoga	Attack
90	Gombe	Funakaye	Bajoga	Armed clash
91	Gombe	Gombe	Gombe	Attack
92	Gombe	Gombe	Gombe	Armed clash
93	Gombe	Balanga	Nyuwar	Armed clash
94	Gombe	Balanga	Tallase	Armed clash
95	Gombe	Balanga	Tallase	Armed clash
96	Gombe	Yamaltu	Deba Kowa	Attack

Appendix 3: Spatial Concentration Conflict Incidences in Gombe State

S/N	State	LGA	Location	Type of Conflict	Count
1	Gombe	Yamaltu	Deba Kowa	Attack	0
2	Gombe	Yamaltu	Deba Kowa	Attack	0
3	Gombe	Yamaltu	Hinna	Attack	0
6	Gombe	Gombe	Gombe	Attack	0
7	Gombe	Funakaye	Ashaka	Armed clash	4
8	Gombe	Gombe	Gombe	Armed clash	12
9	Gombe	Gombe	Gombe	Attack	2
10	Gombe	Gombe	Gombe	Attack	6
11	Gombe	Kaltungo	Kaltungo	Armed clash	2
12	Gombe	Kaltungo	Kaltungo	Armed clash	0
13	Gombe	Kaltungo	Kaltungo	Armed clash	0
14	Gombe	Kaltungo	Kaltungo	Armed clash	6
15	Gombe	Shomgom	Shongom	Armed clash	1
16	Gombe	Billiri	Kalmai	Attack	1
17	Gombe	Billiri	Kalmai	Attack	1
18	Gombe	Shomgom	Kushi	Attack	2
19	Gombe	Billiri	Billiri	Attack	8
20	Gombe	Billiri	Polapindi	Attack	1
21	Gombe	Yamaltu	Deba Habe	Armed clash	0
22	Gombe	Nafada	Bir Balawa	Attack	1
23	Gombe	Nafada	Biri Filani	Attack	1
24	Gombe	Dukku	Dukku	Attack	3
25	Gombe	Nafada	Nafada	Attack	0
26	Gombe	Gombe	Gombe	Abduction/forced disappearance	0
27	Gombe	Gombe	Gombe	Armed clash	3
28	Gombe	Dukku	Bolari	Armed clash	3
29	Gombe	Gombe	Gombe	Attack	0
30	Gombe	Kaltungo	Kaltungo	Armed clash	0
31	Gombe	Billiri	Billiri	Armed clash	0
32	Gombe	Billiri	Billiri	Armed clash	1
33	Gombe	Balanga	Nyuwar	Armed clash	1

S/N	State	LGA	Location	Type of Conflict	Count
34	Gombe	Balanga	Baianga	Armed clash	0
35	Bauchi	Darazo	Gombe Aba	Armed clash	4
36	Gombe	Dukku	Dukku	Armed clash	0
37	Gombe	Gombe	Gombe	Armed clash	50
38	Gombe	Dukku	Bolari	Armed clash	1
39	Gombe	Funakaye	Ashaka	Armed clash	80
40	Gombe	Funakaye	Bajoga	Armed clash	67
41	Gombe	Funakaye	Ashaka	Armed clash	10
42	Gombe	Nafada	Nafada	Armed clash	0
43	Gombe	Funakaye	Ashaka	Armed clash	9
44	Gombe	Gombe	Gombe	Armed clash	7
45	Gombe	Gombe	Gombe	Armed clash	3
46	Gombe	Gombe	Gombe	Armed clash	0
47	Gombe	Balanga	Wala Waja	Armed clash	2
48	Gombe	Gombe	Gombe	Armed clash	0
49	Gombe	Balanga	Baianga	Abduction/forced disappearance	0
50	Gombe	Akko	Kumo	Armed clash	1
51	Gombe	Akko	Tumu	Armed clash	0
52	Yobe	Fika	Ngalda	Armed clash	1
53	Gombe	Gombe	Gombe	Armed clash	3
54	Gombe	Gombe	Gombe	Armed clash	2
55	Gombe	Gombe	Gombe	Armed clash	2
56	Gombe	Gombe	Gombe	Armed clash	1
57	Gombe	Gombe	Gombe	Armed clash	0
58	Gombe	Akko	Kumo	Armed clash	0
59	Gombe	Gombe	Gombe	Armed clash	2
60	Gombe	Gombe	Gombe	Armed clash	1
61	Gombe	Gombe	Gombe	Armed clash	0
62	Gombe	Gombe	Gombe	Armed clash	0
63	Gombe	Akko	Lawanti	Armed clash	1
64	Gombe	Dukku	Dukku	Attack	0
65	Gombe	Gombe	Gombe	Attack	1
66	Gombe	Kwami	Bojude	Attack	0
67	Gombe	Gombe	Gombe	Attack	9
68	Gombe	Gombe	Gombe	Armed clash	1
69	Gombe	Billiri	Billiri	Armed clash	0
70	Gombe	Shomgom	Chongwom	Armed clash	1
71	Gombe	Akko	Kumo	Abduction/forced disappearance	0
72	Gombe	Balanga	Dagri	Attack	0
73	Gombe	Gombe	Gombe	Attack	1
74	Gombe	Dukku	Shabiwa	Abduction/forced disappearance	0
75	Gombe	Akko	Tudun Wada	Attack	0
76	Gombe	Billiri	Tudun Kwaya	Abduction/forced disappearance	0
77	Gombe	Billiri	Pobawure	Attack	1
78	Gombe	Billiri	Billiri	Attack	2
79	Gombe	Billiri	Billiri	Attack	2
80	Gombe	Shomgom	Kushi	Attack	1
81	Gombe	Akko	Kumo	Attack	0
82	Gombe	Akko	Pindiga	Armed clash	0
83	Gombe	Shomgom	Bangunji	Attack	1
84	Gombe	Gombe	Gombe	Attack	1
85	Gombe	Akko	Kumo	Attack	2
86	Gombe	Gombe	Gombe	Attack	5
87	Gombe	Gombe	Gombe	Armed clash	1
88	Gombe	Gombe	Gombe	Attack	2
89	Gombe	Funakaye	Bajoga	Attack	0
90	Gombe	Funakaye	Bajoga	Armed clash	0
91	Gombe	Gombe	Gombe	Attack	6
92	Gombe	Gombe	Gombe	Armed clash	1

S/N	State	LGA	Location	Type of Conflict	Count
93	Gombe	Balanga	Nyuwar	Armed clash	1
94	Gombe	Balanga	Tallase	Armed clash	5
95	Gombe	Balanga	Tallase	Armed clash	8
96	Gombe	Yamaltu	Deba Kowa	Attack	1

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