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RESEARCH ARTICLE

LIVESTOCK FARMING IN THE FACE OF THE SECURITY CRISIS IN THE YAADGA REGION: FROM EXTENSIVE RANGELANDS TO ENCLAVES OF RETREAT

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Abstract

In the Sahel, the security crisis linked to terrorism is disrupting mobility patterns and agropastoral equilibria. This research analyzes how the pastoral space of the Yaadga region, historically fluid and structured as a network-space, has been contracting and fragmenting since 2017 under the effect of insecurity, giving rise to an insular geography of enclaves. The study draws on a mixed-methods approach combining empirical field surveys of 385 actors in the livestock-meat value chain. The results reveal a process of deterritorialization and forced confinement among herders. The Retreat Sedentarization Index (RSI) shows that 59% of herders have shifted into urban or peri-urban sedentarization as a refuge strategy. This transition is accompanied by a collapse of grazing itineraries, with the Spatial Contraction Rate (SCR) reaching its peak in Loroum province at 99% spatial contraction. In the face of livestock raiding, the Herd Miniaturization Index (HMI) reveals a collapse of livestock capital in favor of subsistence micro-herds. Finally, the marketing infrastructure has been restructured through an asymmetric shift of herds from the North toward the receiving South. This distress-driven sedentarization raises questions about the long-term ecological and land-tenure viability of peri-urban host areas and calls for a rethinking of territorial planning policies in times of conflict.

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Introduction:-

Sahelian pastoral livestock farming has historically relied on a logic of spatial fluidity and large-scale ecological complementarity. In Burkina Faso, this sector structurally constitutes the country's third-largest export product after gold and cotton, while representing the vital socio-economic pillar of nearly 40% of rural household income (MRAH, 2020, p. 11). In the northern fringe of the country, this activity has historically been organized around the concept of "network-space" (espace-réseau) theorized by J. Gallais (1975, p. 85) and D. Rétaillé (2023, p. 12). This model is characterized by the free circulation of people and animals, the interconnection of transhumance corridors, and a high degree of temporal flexibility in seasonal movements. This system of fluid, extensive rangelands allowed for continuous arbitrage between the inter-annual variability of biophysical resources (water, biomass) and the

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commercial opportunities of cross-border regional markets, which historically extended toward the terminal markets of the coastal Gulf of Guinea countries such as Côte d'Ivoire, Ghana, Togo, and Benin.

However, the outbreak and intensification of the terrorism-related security crisis since 2017 in the Yaadga region has acted as a catalyst of rupture. Beyond the humanitarian tragedy, this conflict has generated a geographical crisis. By blocking access to bush grazing areas, undermining the safety of transhumant movements, and forcing the closure of livestock markets, the armed conflict has broken territorial continuity and the fluidity of traditional flows, and has asphyxiated the traditional pastoral economy. To grasp these spatial and identity-related reconfigurations, this study sits at the intersection of three theoretical fields in human geography and local geopolitics. First, the theory of territorialization, deterritorialization, and reterritorialization (TDR). For C. Raffestin (1980, p. 75), territorialization is understood as the process by which an actor appropriates and shapes physical space through relations of power, labor, and information. In a context of war, the outbreak of terrorist violence triggers a violent process of deterritorialization for mobile herders (predominantly Fulani), characterized by the loss of control over their migratory routes (ancestral corridors) and their physical points of attachment. Reterritorialization then occurs under constraint, through a brutal reaction of the lived territory, forcing a retreat from the pastoral hinterland toward urban points or enclaves secured by the Defense and Security Forces (DSF).

Next, the concept of geopolitical fragmentation and archipelization. Theorized by S. Rosière (2008, p. 12), fragmentation characterizes a process of violent division or differentiation of a previously homogeneous space. Applied to the Yaadga region, generalized insecurity breaks up the territory into an archipelago of autonomous enclaves separated by grey zones under terrorist control. This fragmentation destroys the open pastoral space in favor of de facto barriers and boundaries that freeze mobility and choke off the connectivity of commercial networks. Finally, the theory of saturation by backflow and spatial friction. G. Magrin (2013, p. 12) demonstrates that border-related geopolitical crises provoke shifts in human and animal flows according to a cumulative flight gradient. This mechanism of saturation by backflow mechanically displaces anthropic pressure from combat zones (North) toward refuge territories (South), transforming peri-urban fringes and host areas into hotspots of accelerated environmental degradation and acute proximity conflicts over residual resources (water, crop residues).

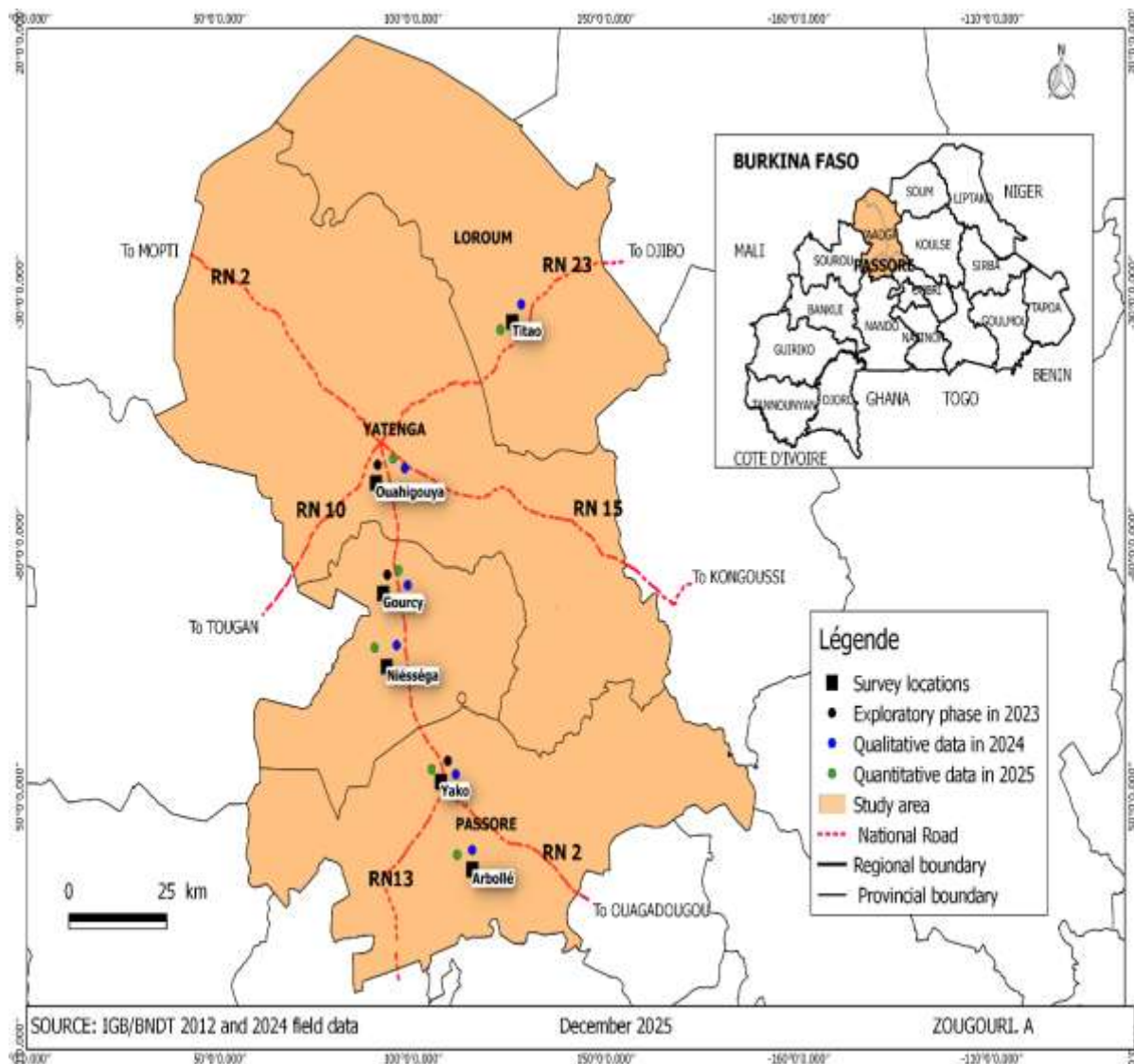
In this respect, the Yaadga region constitutes an ideal analytical framework, with an asymmetric transition extending from the zone of absolute confinement under a border blockade in the North (Yatenga and Loroum) to the areas less affected by the crisis in the South (Passoré and Zandoma). This forced transition therefore raises a fundamental question: to what extent does the security crisis in the Yaadga region entail a rupture of the pastoral network-space model in favor of an insular geography of enclaves, and how does this transition affect the socio-economic, spatial, and biological structures of livestock farming along the North-South gradient? To address this central research question, this article is organized around three main sections. After presenting a mixed-methods protocol, we analyze the geography of confinement, commercial backflow, and biological herd miniaturization by province. Finally, the last section is devoted to a discussion of the erosion of peri-urban commons and the asymmetric limits of the local moral economy.

Methodology:-

Presentation of the study area:-

Located in the northern part of Burkina Faso, the Yaadga region is one of the country's 17 regions. The town of Ouahigouya, the regional capital, is crossed by National Road No. 2, the axis linking Ouagadougou to Mopti, Mali. Ouahigouya is located 181 km from Ouagadougou, 57 km from the Malian border, and 222 km from the city of Mopti (Mali). The region comprises four provinces: Yatenga, Loroum, Passoré, and Zandoma. This study focuses on the towns of Ouahigouya, Gourcy, Yako, and Titao, and the village of Youba — located in the Ouahigouya commune—which hosts the largest livestock market in the Yaadga region (Map 1).

Map 1. Study area:-



Sampling and demographics:-

To ensure balanced socio-territorial representativeness, this research design combines a thematic spatial network with a rigorous demographic distribution of value-chain actors. The choice of survey sites responds to the need to capture the diversity of pastoral organizational forms (pastoral livestock farming, agropastoralism, urban livestock farming) as well as the typology of market places (collection, assembly, consumption, and export). Moreover, the spatial network is dictated by the insecurity gradient, which increases from South to North within the Yaadga region. This is why the investigations were located in the provincial capitals of Ouahigouya, Gourcy, Yako, and Titao, which concentrate the bulk of internally displaced herders subject to urban confinement. In addition, this zoning incorporates control sites such as the Niességa and Arbolle markets in the South, offering a point of comparison with the frontline areas of the North.

Owing to the absence of an updated sampling frame in a context of conflict, the study deploys a purposive sampling method based on proportional quotas. The overall sample is thus structured around 385 actors in the livestock-meat value chain. The quantitative component draws on the participation of 100 producers (herders), 100 livestock traders, 60 butchers (processors), and 55 consumers. This is complemented by a qualitative component involving 10 administrative or customary authorities, 10 NGO representatives (institutional support), 5 transporters, and 5 livestock feed vendors.

Data collection method and analytical tools:-

Data acquisition and collection for this research rest first and foremost on rigorous methodological triangulation, combining the systematic use of secondary documentary sources with careful, direct primary surveys conducted in the field. In order to establish a stable baseline, the documentary research first compiled the statistical registers of the DRARAH (Regional Directorate for Animal and Fisheries Resources), the pastoral reports of APESS and the Réseau Billital Maroobé (RBM), as well as the humanitarian bulletins of SP-CONASUR and OCHA. This body of secondary information was directly coupled with an empirical field survey mobilizing an overall multi-actor sample of 385 respondents. On one hand, the quantitative component took the form of 315 individual questionnaires, progressively distributed among 100 producers (herders), 100 livestock traders, 60 butchers, and 55 consumers, in order to faithfully represent each link in the value chain. On the other hand, the qualitative component consisted of 55 in-depth semi-structured interviews and 10 focus groups with technical extension staff, transporters, input vendors, and administrative or customary leaders. In parallel, in order to capture the value chain across its seasonal extremes, the data collection schedule was split between the critical lean season (soudure pastorale) of April 2024 for the qualitative approach and the post-rainy-season abundance period of October 2025 for the quantitative approach. Finally, to overcome the physical inaccessibility constraints linked to insecurity in the northern areas of Loroum and Yatenga, we relied on trusted community relays and remote telephone interviews, while observing an ethical protocol of anonymization and verbal informed consent to protect respondents from any reprisals.

Following this data collection, processing procedures were designed to structure this raw material and convert it into precise geographic and spatio-economic indicators. In this regard, the quantitative questionnaire data were entered and systematically coded using Excel software, enabling the construction of cross-tabulations and dynamic charts to analyze crisis operating accounts, assess the decline in vaccination coverage, and track fluctuations in meat prices. On the other hand, the qualitative verbatim material from the interviews and group discussions was subjected to rigorous thematic content analysis in order to classify individual risk perceptions and identify actors' subsistence logics. In addition, spatial processing was based on the use of a Geographic Information System (QGIS), a tool that proved indispensable for geolocating and mapping the progressive closure of bush livestock markets, the contraction of grazing and fallow-land radii, and the reconfiguration of new marketing corridors toward secured urban areas. The in-depth analysis of this processed information thus moves beyond simple factual description to adopt a plural theoretical approach, combining a territorial SWOT diagnostic with theoretical approaches from human geography and economic sociology.

First, the SWOT matrix is mobilized as a territorial diagnostic tool to confront the historical structural vulnerabilities of livestock farming with direct security threats. Second, the theory of survival strategies and the rural moral economy, strongly influenced by James C. Scott's (1976, p. 18) "Safety First" principle, is deployed at the micro-behavioral scale to decode actors' avoidance rationality in the face of radical uncertainty, thereby clarifying the biological shift toward small livestock, preventive liquidation, and subsistence pluriactivity. Third, G. Benko and A. Lipietz's (1995, p. 297) theory of spatial regulation crowns this analytical framework at the macro-geographic scale, theorizing the transition from a fluid, continuous "network-space" to a fragmented "territory of enclaves" broken up into islands of security. It is precisely at the intersection of these analytical frameworks that the study calculates and quantifies, in an original way, its key indicators — namely the Retreat Sedentarization Index (RSI), the Herd Miniaturization Index (HMI), the Transaction Dematerialization Index (TDI), the Community Solidarity Index (CSI), and the Income Diversification Rate (IDR).

Results:-

Field surveys conducted in the Yaadga region reveal that chronic insecurity acts as a powerful force of spatio-economic rupture, reconfiguring traditional pastoral flows along a marked North-South gradient.

Reduction of mobility and contraction of pastoral space:

The historical shift from a continuous network-space to a territory of enclaves is first materialized by a spatial contraction of pastoral mobility, directly quantified in the field through the shrinking of grazing radii. Indeed, the analysis reveals that the northern province of Loroum, which has become a veritable crisis frontline zone, has undergone an absolute spatial contraction of 99%, with the livestock feeding radius having collapsed from more than 100 km toward the Malian border before 2017 to less than 1 km under the current blockade (Table 1).

Table 1. Spatial contraction of grazing radii in the face of the security crisis

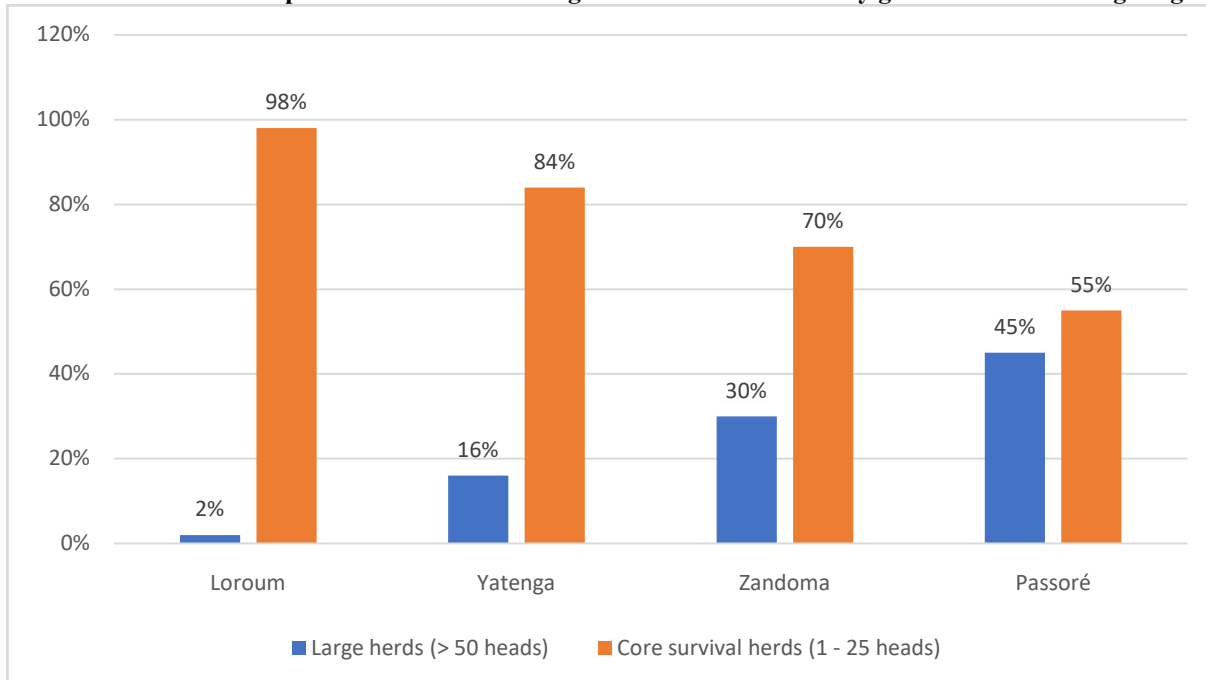
Province	Grazing radius before 2017 (km)	Grazing radius from 2017 to present (km)	Spatial contraction rate (%)	Resulting territorial status and dynamics
Loroum (Titao)	> 100 km (toward Mali)	< 1 km	99%	Absolute confinement under blockade; feeding restricted to strict subsistence
Yatenga (Ouahigouya)	50-75 km	2-25 km	66%	Peri-urban refuge sedentarization; intensive land pressure around the regional capital
Zandoma (Gourcy)	30-50 km	7-10 km	75%	Restricted local mobility; local arrangements for access to lowland crop residues
Passoré (Yako)	30-40 km	7-10 km	70%	Buffer zone; opportunistic sedentarization and intensive use of crop residues

Source: Field data, 2024

Moreover, this phenomenon of geographic strangulation spreads asymmetrically southward, as Yatenga province records a contraction rate of 66% (the radius falling from 50-75 km to a residual range of 2-25 km), while Zandoma and Passoré provinces experience respective contractions of 75% (from 30-50 km to 7-10 km) and 70% (from 30-40 km to 7-10 km). Consequently, fluid cross-border transhumance has definitively ceased in the North, giving way to micro-itineraries of survival gravitating around the rare urban centers secured by regular forces, even though the southern provinces temporarily serve as residual relief corridors toward coastal markets.

Sedentarization of herders and shrinking herd size:-

The rupture of spatial equilibria has forced herders into distress-driven sedentarization on the outskirts of refuge towns, triggering, through a domino effect, a demographic atrophy of the region's productive capital. The surveys show that 59% of the region's livestock actors have been forced to abandon mobility and settle by force in urban or peri-urban areas — a transition closely correlated with the fact that 68% of them hold the status of Internally Displaced Persons (IDPs). In order to evade the systematic raids and mass looting used by terrorist groups as a means of financing their operations, 74% of herders engaged in emergency defensive destocking, selling their animals at knock-down prices to finance their families' flight. The Herd Miniaturization Index (HMI) accordingly reveals an atomization of average herd size, with survival cores (1 to 25 head) now accounting for 98% of residual herds in Loroum and 84% in Yatenga, in contrast to the South (Passoré), where the relative easing of the security stranglehold allows 45% of large herds (> 50 head) to be preserved (Table 1).

Chart 1. Structural recomposition of herd size along the North-South security gradient in the Yaadga region

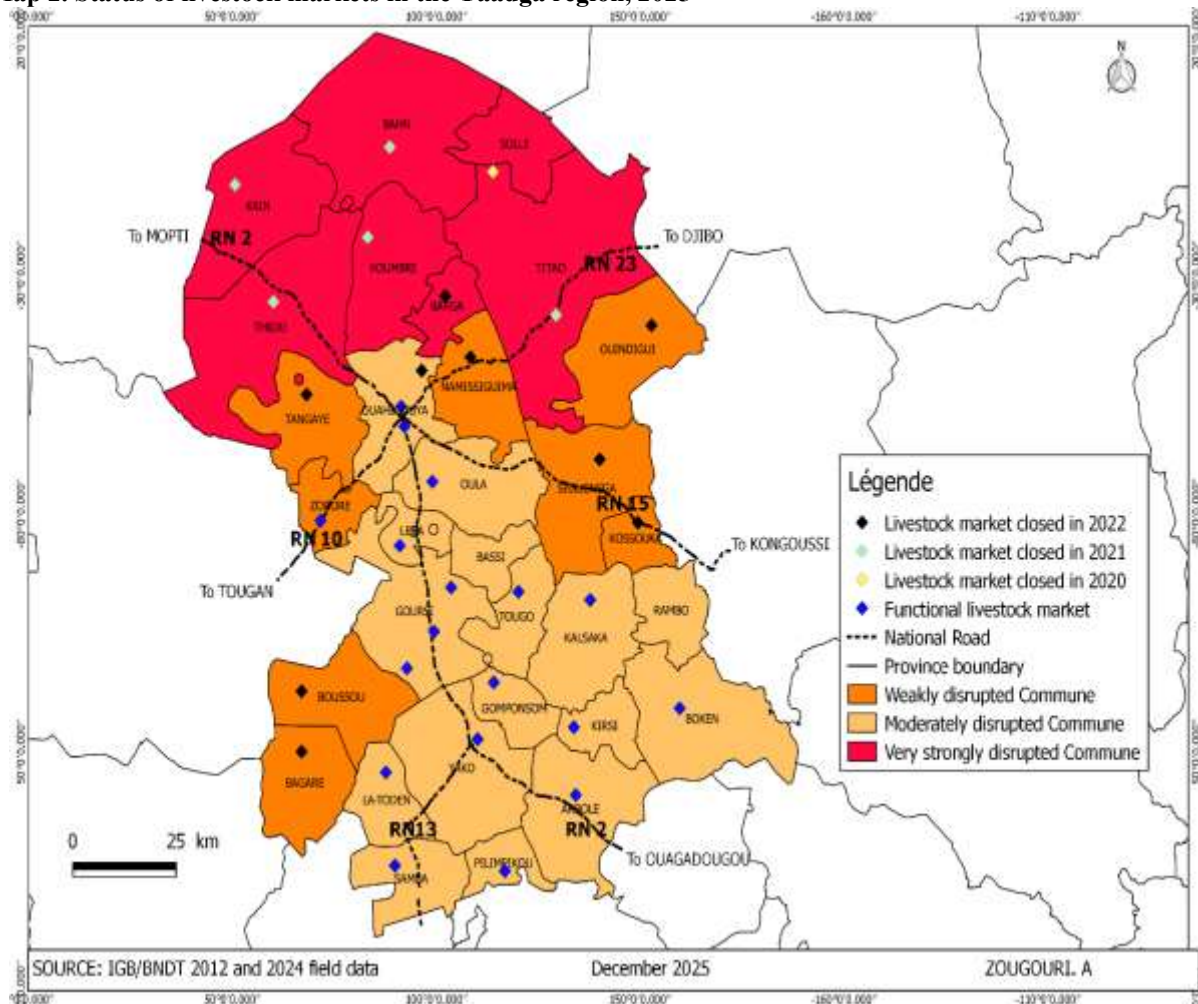
Source: Field data, 2024

In the crisis-stricken provinces of the North (Loroum and Yatenga), large herds of more than 50 head have virtually disappeared, giving way to survival micro-cores of 1 to 25 head held by internally displaced families. These herders carry out a forced biological substitution, favoring the raising of small ruminants (goats and short-cycle sheep) housed within urban compounds, as they are easier to conceal, to evacuate in the event of an attack, and to feed from household waste or purchased industrial feed (SPAI).

Market closures and reorganization of the livestock trade:-

Alongside the disruption of production, geopolitical fragmentation has shattered Yaadga's historical commercial infrastructure through the chain closure of rural livestock markets. This process of network disconnection unfolded in three successive waves, beginning in 2020 with the closure of the pivotal market of Sollé in Loroum, accelerating in 2021 with the suspension of the Thiou, Titao, Bidi, and Kaïn market places, and culminating on 9 December 2022 with the definitive closure of Youba, which had been the largest assembly and export market in the northern region. As a result, physical supply circuits collapsed, causing an 86% contraction of the local livestock supply according to the unanimous account of the traders interviewed. Moreover, this logistical paralysis has drastically lengthened commercial holding times: the time required to assemble a convoy of 30 export cattle rose from 1-2 days in periods of stability to a full week today, forcing operators to abandon collection circuits in favor of costly reverse imports from the localities of Dori or Léo (Map 2).

Map 2. Status of livestock markets in the Yaadga region, 2025



The commercial sector has been paralyzed by the systematic dismantling of traditional market places by armed groups. This logistical dismantling has forced a complete reorganization of transport methods. Traditional on-foot driving of animals, while it partially persists in the secured southern provinces (Passoré, Zandoma) thanks to the maintenance of local proximity circuits, has become impossible in the North owing to the danger of interception and systematic extortion. In Loroum, on-foot driving collapsed from 65% before 2017 to just 2% between 2017 and 2026. Modal transfer now takes place through the use of secured trucks under armed escort or, clandestinely, through the transport of animals by tricycle or motorcycle toward urban transit yards.

The high cost of landless urban livestock farming:-

The forced confinement of herds within the “territory of enclaves” has brought about a radical upheaval in operating costs, trapping distress-stricken herders in a structural financial bind. Indeed, the inaccessibility of free bush watering points has shifted 90% of animal watering to paid urban distribution networks (75% of which depend on ONEA standpipes), monetizing pastoral water at an exorbitant cost of 50 to 100 F CFA per jerrycan in Yatenga. In an urban setting, water is no longer a free natural resource but a costly market service that weighs heavily on herders’ operating accounts. As A.S.¹, a livestock extension officer in Ouahigouya, notes: “Before, in the villages, herders had their own land for grazing and cultivation, but since 2018, all the herders who have moved to town have had to pay for everything, even the water, to keep up their livestock activity.” Furthermore, insecurity has turned the perennial water points of the North and the bush into inaccessible or dangerous zones, breaking transhumance cycles. In addition, the scarcity of natural forage has triggered a hyperinflation of substitute inputs, with the price of

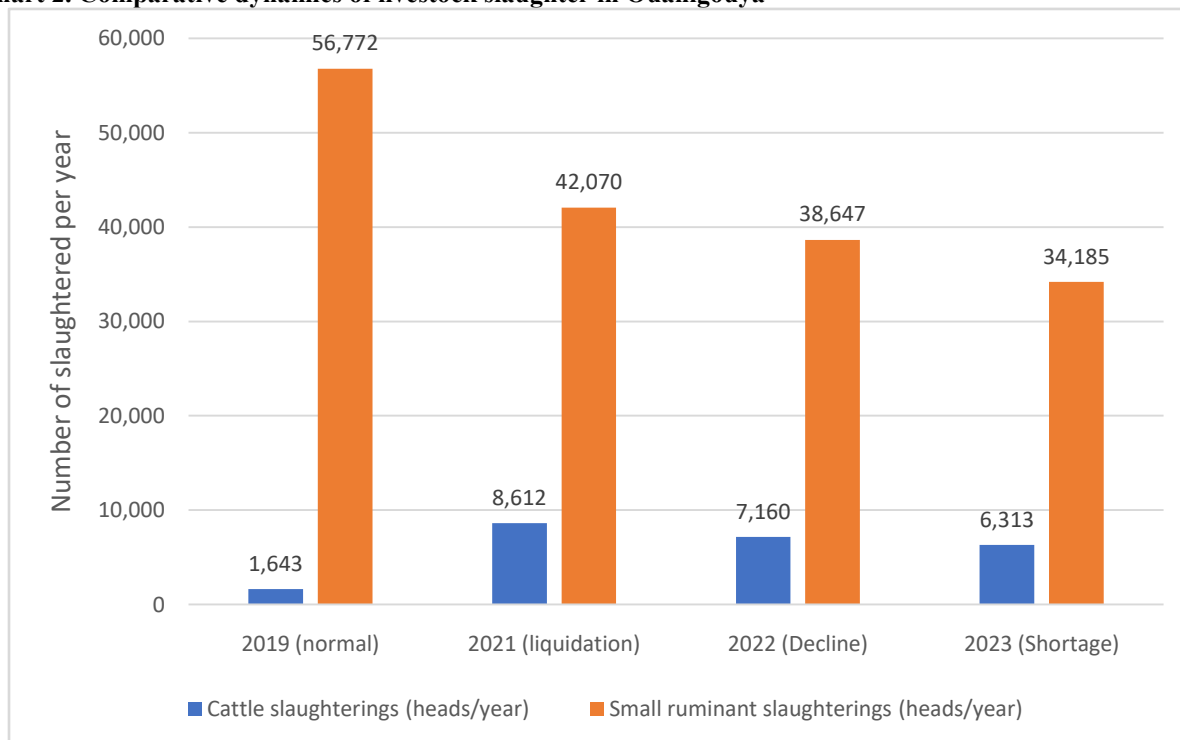
¹Interview conducted in April 2024 in Ouahigouya.

a sack of industrial feed (SPAI) climbing to 13,000 F CFA and a bale of millet straw reaching 250 F CFA. To theorize this economic impasse, the study demonstrates that the Financial Asphyxiation Ratio stands at 0.72, showing that 72% of an animal's final sale price is immediately absorbed by its landless maintenance costs. Finally, on the biological level, the study sets the Biological Viability Threshold (BVT) at a minimum of 5 breeding ewes per displaced household, demonstrating that below this core, the autonomous reproduction of the herd becomes impossible given the family's immediate food needs.

Impact on meat consumption and urban slaughter:-

The disruptions affecting the upstream production segment have a systemic effect on the urban downstream of the value chain, causing a collapse in processing volumes and a forced shift in consumption habits. At the Ouahigouya slaughterhouse, cattle slaughter fell from 8,612 head at the 2021 liquidation peak to just 6,313 head in 2023 (Chart 2), while the dairy sector collapsed by more than 99%, with daily collection plunging from 2,000 liters before 2015 to a token quantity of 5 to 10 liters today.

Chart 2. Comparative dynamics of livestock slaughter in Ouahigouya



Source: Field data, 2024

In Yatenga province, slaughtering has become concentrated in the urban center of Ouahigouya, where taxes have doubled under private management, rising from 2,000 to 5,000 F CFA per bovine carcass, while D.M.², head of the Ouahigouya butchers' association, notes that: "Daily slaughter has fallen from 60 cattle at the peak of the crisis to only 15 to 20 head." The number of animals slaughtered has thus declined at every phase of the crisis in the town of Ouahigouya. Moreover, insecurity is redefining market criteria, as security-related proximity now determines 60% of purchasing decisions, to the detriment of price, driving an informalization of trade circuits in which clandestine sales within compounds now account for 80% of transactions in Titao, compared with only 35% in Yako, which retains public oversight over 65% of trade.

Survival strategies and community solidarity:-

First, the security crisis has caused the collapse of the extensive mobile system in favor of an involuntary process of urban and peri-urban sedentarization under extreme spatial constraint. Indeed, the inaccessibility of bush rangelands has pushed pastoral and agropastoral herders from crisis-affected areas to settle in peripheral security enclaves. This forced exodus, quantified by a Retreat Sedentarization Index (RSI) of 59%, does not reflect a voluntary technical

²Interview conducted in April 2024 in Ouahigouya.

choice but rather an emergency defensive anchoring within protected urban centralities such as Ouahigouya, Gourcy, Titao, and Yako. As a result, this massive influx of refugee populations and herds generates acute hydro-land and ecological saturation in the host areas, transforming formerly fluid pastoral territories into confined spaces characterized by proximity friction and violent conflicts of use between displaced herders and indigenous market-gardening communities over access to water points and land.

This territorial rupture is accompanied, in parallel, by a pathological decapitalization, in which emergency sales and dispossession redefine the patrimonial function of livestock to the detriment of the value chain's upstream segment. In order to shield standing capital from the systematic raids perpetrated by armed groups, 74% of herders engaged in panic defensive destocking, selling their animals at knock-down prices to finance their families' flight or to purchase cereals. The application of the Herd Miniaturization Index (HMI) accordingly reveals an atomization of family herd sizes, now reduced to residual micro-cores of 1 to 25 head, triggering the collapse of the social prestige once associated with animal ownership in favor of an economy of strict necessity. Nevertheless, for many distress-sedentarized herders, peri-urban confinement proves to be a genuine financial trap. Deprived of free bush biomass, producers must bear the inflation of emergency input costs, which drives them toward the definitive liquidation of their productive tool in order to secure their own subsistence.

To cope with this pastoral impasse, dispossessed and landless herders are forced to spread their economic risk through the adoption of pure-survival pluriactivity. The surveys show that the Income Diversification Rate (IDR) reaches a critical threshold of 77%, meaning that more than three-quarters of pastoral households no longer depend exclusively on livestock farming to meet their daily cereal needs. These sedentarized herders accordingly turn to precarious, informal alternative activities such as artisanal gold panning, small-scale urban trade, casual agricultural labor, guarding services, or cart transport. Far from constituting a lever for social advancement, this functional hybridization consecrates an imposed proletarianization in which the sale of labor power compensates for the loss of livestock assets. Moreover, this prolonged urban sedentarization and reliance on urban micro-activities create a trap of structural vulnerability, undermining the intergenerational transmission of nomadic know-how among young men, which seriously jeopardizes the renewal of the profession and drives the most precarious herders toward permanent humanitarian dependency. Finally, herders are reactivating their community mutual-aid networks, with the Community Solidarity Index (CSI) standing at 50%. This active solidarity takes the form of traditional animal lending or tactical entrustment, whereby herds are fragmented and dispersed among stable allies — validating the idea that relational structures and the dematerialization of transactions constitute the ultimate substitute infrastructure in the face of asphyxiation and the erosion of state control.

Discussion:-

The discussion of the results obtained in the Yaadga region allows us to anchor our territorial diagnosis within contemporary debates on agropastoralism in arid environments and to test the relevance of our theoretical frameworks. First, the geopolitical and spatial analysis of the crisis in the Yaadga region brings to light a historic metamorphosis characterized by the abrupt shift from a fluid network-space to a fragmented territory of enclaves, empirically validating major theories in conflict geography and territorial regulation. In this regard, the work of Yves Lacoste (1976, p. 86) on space as strategic knowledge and as a product of power rivalries between state and non-state actors proves indispensable for understanding how terrorist actors transform Yaadga into a complex theater of operations. Moreover, this dynamic of forced appropriation and the disruption of road axes resonates with the concept of "resource war" theorized by P. Le Billon (2001, p. 564), demonstrating that livestock and commercial infrastructure become genuine instruments of power and of financing for war. It is from this perspective of rupture that S. Rosière's (2008, p. 22) theory of territorial partition and G. Magrin's (2020, p. 15) theory of enclave territories find expression, shedding light on the fragmentation of the Yaadga region into secured islands controlled by the army, on one hand, and grey zones under insurgent control, on the other. The application of G. Benko and A. Lipietz's (1995, p. 298) model of structural adjustment in spaces of regulation further demonstrates how classical public governance collapses in the face of fragmented, hybrid regulatory arrangements. Consequently, faced with this physical compartmentalization of useful space, herders mobilize what B. Thibaud (2015, p. 253) describes as "territorialities in motion," whereby the plasticity of circumventing mobility reorganizes flows in the face of institutional failure.

Second, this geopolitical metamorphosis of space forces Sahelian agropastoralists into an involuntary urban retreat and a preventive fragmentation of herds that corroborates the theory of the moral economy and the "Safety First" principle modeled by J.C. Scott (1976, p. 42), according to which the vulnerable producer seeks above all to guarantee immediate biological survival rather than to maximize risky profit. This defensive rationality is reinforced

by G. Ancey's (1977, p. 42) analysis of the work-consumption balance, which highlights the predominance of non-market considerations in herd management, whereby livestock is treated as standing insurance rather than as a tradable commodity. Moreover, the spatial avoidance behaviors described by M. Benoit (1982, p. 42) reveal that, in line with A. Bonfiglioli's (1988, p. 42) work, the animal stands as the pivot of a "security capital" inseparable from the social reproduction of the group in the face of shocks. This is why the dispossession and forced liquidation of livestock can be analyzed, following J. Boutrais (1994, p. 178), as a pathological involuntary decapitalization, in which the loss of the spatial elasticity theorized by B. Thébaud (2002, p. 42) undermines the herder's social status. Nevertheless, I. Scoones's (1995, p. 293) analysis reminds us that the resilience of pastoral societies in the face of this distress-driven decapitalization remains contingent on the strength of informal institutions, even though the asymmetric vulnerability trajectories theorized by B. Lallau (2011, p. 168) highlight the definitive exclusion of the poorest herders.

Furthermore, the peri-urban concentration of displaced herds within the territory of enclaves shows, drawing on B. Pecqueur's (2000, p. 59) concept of "territorial resource," that landless confined livestock farming loses its economic viability owing to the exorbitant cost of emergency industrial inputs and paid water. Similarly, the atrophy of herds breaks the age-old interdependence of agropastoral terroirs theorized by E. Landais (1992, p. 286) and P. Lhoste (1987, p. 287), which rests on the close integration of livestock farming and Sahelian rain-fed agriculture. Indeed, the forced cessation of organic fertility transfer (manure) analyzed by M. Blanchard (2010, p. 274), and the decline in draft-animal energy modeled by P. Dugué and A.L. Dongmo (2004, p. 162), directly penalize the subsistence cereal productivity of host territories. In this way, the asphyxiation of the upstream production segment cascades down to the urban consumer, producing what S. Dury (2002, p. 81) describes as an emergency protein-substitution transition, whereby the high cost of red beef pushes households toward frozen fish or industrial poultry. Ultimately, the regional average Financial Asphyxiation Ratio of 0.72 aligns with G. Courade's (2000, p. 32) thesis, demonstrating that forced openness to market inputs, far from being a linear technical progress, creates new risks of vulnerabilization for family producers excluded from pastoral land.

Finally, in the face of the dismantling of commercial infrastructure and the collapse of traditional systems, value-chain actors are responding by developing highly innovative forms of collective action and technological avoidance. In this respect, digital avoidance behaviors can be explained through V. Ancey's (1997, p. 18) options-based approach, showing that, faced with mortal danger and the surge in roadside extortion, traders are virtualizing their transactions via WhatsApp and Mobile Money in order to render financial flows invisible. In parallel, negotiated cohabitation within saturated host areas rests on what A. Marty (2000, p. 35) calls a "local agreement" — that is, a regulatory mechanism based on endogenous negotiation, indispensable for the shared management of common resources. These conciliatory mechanisms, together with S. Hagberg's (2001, p. 26) analysis of the importance of local mediation in preventing the crystallization of identity-based and agropastoral tensions, converge with the study's Community Solidarity Index (CSI). Moreover, the reactivation of kinship networks through animal lending or entrustment aligns with the work of S. Beucher (2007, p. 42) and C. Ardit (1993, p. 42), establishing social cohesion as a genuine form of intangible capital in the face of major security risks. Nevertheless, this crisis moral-economy model remains hampered by what J. Betabelet (2018, p. 277) and G. Ankogui-Mpoko (2010, p. 275) describe as the drift toward suspicion and the stigmatization of Fulani herders in the Sahel, whereby a security-driven amalgamation threatens national cohesion and durably destabilizes rights of access to bush territories.

Conclusion:-

In sum, the geographic analysis conducted in this research establishes the paradigmatic transition from a fluid, continuous network-space to a fragmented, discontinuous territory of enclaves under the effect of the security crisis in northern Burkina Faso. This spatial upheaval, driven by the proliferation of armed violence and the systematic obstruction of major pastoral corridors, marked by the spatial death of Youba, Sollé, and Méné, and by the drastic contraction of usable grazing radii (reaching 99% absolute contraction in Loroum), has destroyed the historic elasticity that characterized extensive Sahelian transhumance. As a result, pastoral space is no longer a milieu of free biophysical opportunity but has been reconfigured into a mosaic of urban security archipelagos under intense environmental, land-tenure, and political strain. Moreover, this territorial compartmentalization has produced an involuntary, distress-driven sedentarization for displaced producers, triggering, through a cascade effect, a pathological decapitalization of households. This dynamic is reflected in the fact that 59% of the region's livestock actors are now confined to peri-urban areas, a precarity closely correlated with Internally Displaced Person (IDP) status for 68% of the herders surveyed. This is why, driven by fear of raiding and by the collapse of the rural economy, 74% of herders engaged in emergency defensive destocking, selling off their herds at knock-down prices to finance their families' immediate physical survival. At the same time, the socio-economic modeling of this urban

confinement-based livestock farming reveals the objective limits of artificial landless intensification and deconstructs institutional dogmas of modernization. In the absence of access to natural pastures, animal feeding and watering have become entirely monetized, trapping distress-stricken herders in a financial bind materialized by a Financial Asphyxiation Ratio of 0.72. As a result, 72% of the final sale price of livestock is absorbed by the purchase of industrial inputs (SPAI) and paid ONEA-network water, artificially keeping families on humanitarian life-support, since their herd size falls below the Biological Viability Threshold (BVT) of 5 breeding ewes required for autonomous herd renewal. Finally, far from passively enduring this geographic asphyxiation, value-chain actors are responding with creative forms of collective action and technological avoidance that temporarily re-articulate the market economy. To circumvent roadside extortion and the theft of physical cash, traders have appropriated digital avoidance tools by dematerializing negotiations on WhatsApp and securing the entirety of financial settlements through Mobile Money. Likewise, the reactivation of the Community Solidarity Index (CSI) through animal lending or entrustment, coupled with an Income Diversification Rate (IDR) of 77%, attests to the organizational plasticity of the pastoral system in the face of conflict.

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