



ISSN (O): 2320-5407
ISSN (P): 3107-4928

Journal Homepage: www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI: 10.21474/IJAR01/24338
DOI URL: <http://dx.doi.org/10.21474/IJAR01/24338>



RESEARCH ARTICLE

COMMUNAL TYPOLOGY OF LIVELIHOOD VULNERABILITY IN MATÉRI AND BANIKOARA, BORDER AREAS OF NORTHERN BENIN

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Manuscript Info

Manuscript History

Received: 08 August 2026

Final Accepted: 10 September 2026

Published: October 2026

Key words:-

livelihood vulnerability; LVI-IPCC;
typology; forced displacement; Matéri;
Banikoara; northern Benin

Abstract

Background: Since 2021, armed groups spreading from the Sahel have turned the northern communes of Benin into places of refuge for displaced people. An average vulnerability score says little about how deficits combine inside a household, or how they differ from one commune to the next.

Methods: A multisector household survey was carried out from 29 August to 4 September 2026 among 250 households in Matéri (156) and Banikoara (94): host families, internally displaced persons (IDPs), and refugees or asylum seekers. The Livelihood Vulnerability Index (LVI) and its IPCC variant were built from 33 sub-components grouped into eight components. A multiple correspondence analysis followed by hierarchical clustering was run on 16 active variables.

Results: Both communes show the same moderate LVI (0.468 in Banikoara, 0.464 in Matéri), but not the same structure. Sensitivity outweighs exposure (0.738 and 0.700 against 0.188 and 0.213). Four household types emerged: direct victims of violence and dispossession (17.2%), households with preserved livelihoods (14.4%), households under water and housing stress who sell assets to cope (38.4%), and households in severe food insecurity, often headed by women (30.0%). The third type dominates Banikoara (61.7% of households) and the fourth dominates Matéri (41.0%). Commune and type are strongly associated ($\chi^2 = 39.9$, $df = 3$, $p < 0.001$; Cramér's $V = 0.40$).

Conclusion: Aid in these two communes is better targeted by household profile and by arrondissement than by displacement status alone: water and housing services in Banikoara, food assistance and recovery support for female-headed households in Matéri, and protection and asset restitution for direct victims in both.

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Introduction:-

Since 2021, and more clearly from 2022, security in northern Benin has deteriorated as armed violence from the Sahel spreads towards the coastal states [1,2]. Atacora and Alibori, which lean against the Pendjari and W complexes, take most of the incidents: attacks on defence forces and civilians, improvised explosive devices, kidnappings and restrictions on movement [3]. Displacement monitoring by the International Organization for Migration shows the number of IDPs in the north rising from 27,294 in round 3 to 42,409 in round 5 (March 2026). Matéri (18,606 IDPs) and Banikoara (2,985) are among the three most affected communes, and refugees and asylum seekers from Burkina Faso, Niger and Togo have arrived as well [4].

Vulnerability is understood here as the degree to which a system is likely to be harmed, given its exposure, its sensitivity and its capacity to adapt [5,6]. Livelihoods are the capabilities, assets and activities that allow households to make a living and to face shocks [7-9]. In these communes rain-fed farming and herding carry the local economy, and insecurity acts in two ways. It is a shock, through lost assets, deaths and destroyed property. It is also a lasting constraint, because it limits access to fields and transhumance corridors and disturbs markets. Vulnerability therefore comes from exposure to security shocks, from sensitivity linked to living conditions, and from an adaptive capacity that is unevenly shared among host families, displaced people and refugees [10,11]. All of this lands on production systems that were already exposed to climate hazards and land pressure.

Needs assessments tell us what households lack. They less often show how the deficits pile up in the same household, or how they spread across a commune. Two communes can have almost the same average vulnerability and still shelter very different households, which call for different responses. The Livelihood Vulnerability Index (LVI) proposed by Hahn et al. [12] offers an aggregate framework that fits household survey data. It has been applied widely in West Africa [13] and elsewhere [14,15], and combined with a classification method it can take us from an average score to a typology of situations.

This paper builds a communal and sub-communal typology of household livelihood vulnerability in Matéri and Banikoara. Three questions guide it. How vulnerable are households in each commune, and through which components? How does vulnerability vary between arrondissements and with household status? Which types of household can be distinguished, and how are they shared between the two communes? The working hypothesis is that, at a comparable overall level, the two communes differ in the structure of their vulnerability, which would justify a territorially targeted response.

Materials and Methods:-**Study area:-**

Figure 1 locates the two communes in northern Benin. Matéri (Atacora) borders Burkina Faso and the Pendjari National Park. It has six arrondissements, five of which were surveyed (Dassari, Gouandé, Matéri, Tantéga and Tchianhoun-Cossi). Banikoara (Alibori) also borders Burkina Faso, lies close to Niger, runs along the W National Park and is a major cotton basin; all eight of its arrondissements were covered. The two communes are not exposed in the same way. According to IOM round 5, Matéri hosts more than six times as many IDPs as Banikoara, together with a large share of refugees from Burkina Faso and Togo, whereas the displaced households of Banikoara come mostly from within Alibori and from Niger.

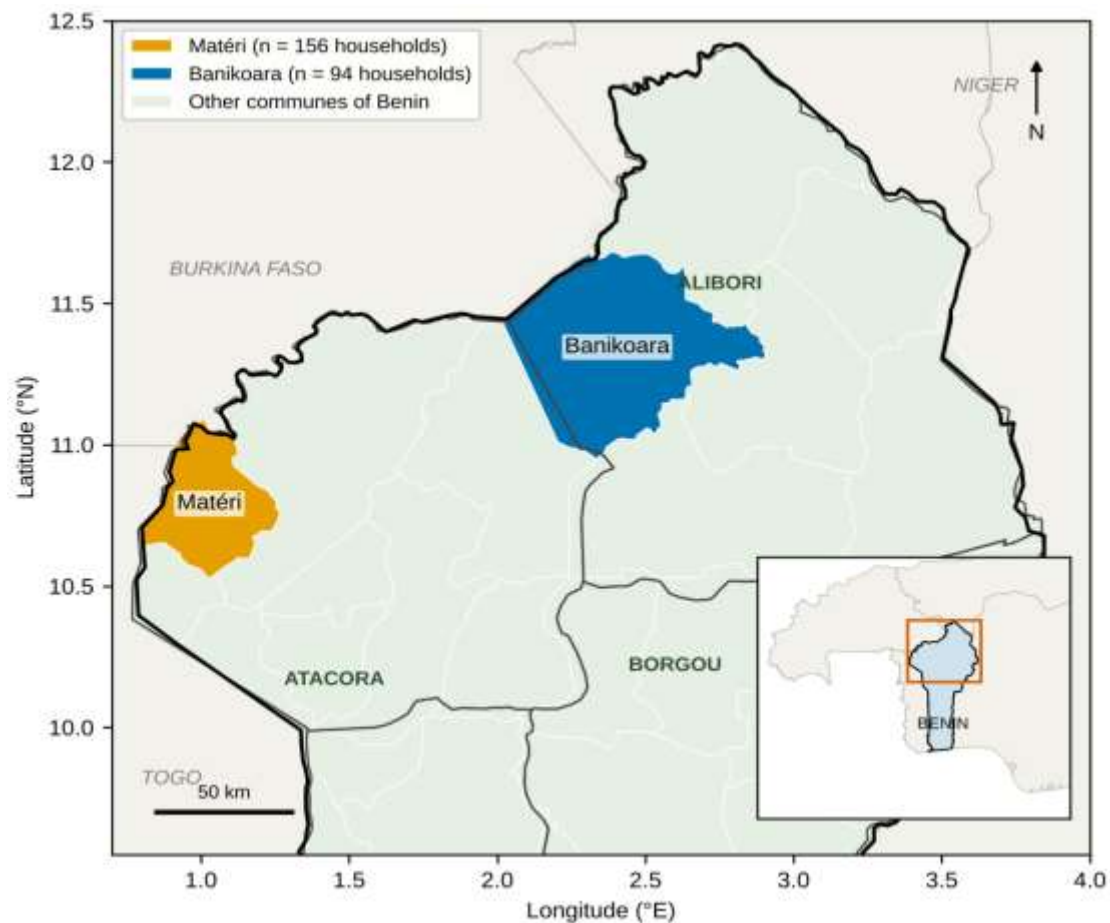


Figure 1. Location of the communes of Matéri and Banikoara in northern Benin. Administrative boundaries: geo Boundaries [16].

Data and sampling:-

The data come from the multisectoral needs assessment carried out by the Benin Red Cross in Atacora, Alibori and Borgou [4]. The household questionnaire, programmed on KoboCollect, covers demography, displacement, shelter, water, sanitation and hygiene, food security, livelihoods, livestock, education, nutrition and protection. Enumerators interviewed household heads or their representatives between 29 August and 4 September 2026, after obtaining informed consent.

Cochran's formula with finite-population correction [17] served as the reference for the sampling design:-

$$n_0 = Z^2 \cdot p(1 - p) / e^2 ; \quad n = N \cdot n_0 / (N + n_0 - 1) \quad (1)$$

where $Z = 1.96$ (95% confidence), $p = 0.5$, $e = 0.05$ and N is the number of IDPs recorded in the department in IOM round 5. The 250 households actually surveyed were shared between the communes in proportion to IDP numbers, 156 in Matéri and 94 in Banikoara, with host and displaced households interviewed in every arrondissement. At this sample size the margin of error on a proportion of 0.5 is about ± 6.2 percentage points for the whole sample, ± 7.8 for Matéri and ± 10.1 for Banikoara. Status was grouped into three categories: host families (100 households), IDPs including returnees (50) and refugees or asylum seekers (100). Qualitative material from the same assessment (eight focus group discussions in Matéri and ten in Banikoara, with four and seven key informant interviews respectively) was used for triangulation [18,19]. Table 1 describes the sample.

Table 1. Characteristics of the sample by commune

Characteristic	Banikoara	Matéri	All
Households surveyed (n)	94	156	250
Host families, n (%)	40 (42.6)	60 (38.5)	100 (40.0)
Internally displaced persons, n (%)	22 (23.4)	28 (17.9)	50 (20.0)
Refugees and asylum seekers, n (%)	32 (34.0)	68 (43.6)	100 (40.0)
Female-headed households, n (%)	22 (23.4)	56 (35.9)	78 (31.2)
Mean household size (persons)	9.5	8.8	9.1
Mean food consumption score	26.1	21.6	23.3

Source: household survey, Benin Red Cross, August–September 2026.

Matéri's sample includes more refugees and more female-headed households. Banikoara's has a few more host families and slightly larger households. The mean food consumption score is low in both communes and lower still in Matéri. Because of these differences in composition, results are also examined by household status.

Livelihood Vulnerability Index:-

The LVI follows Hahn et al. [12], adapted to forced displacement. The climate shocks of the original model are replaced by security shocks, in line with work that measures exposure to violence in household surveys [20]. Thirty-three sub-components, all oriented so that a high value means high vulnerability, are grouped into eight major components (Table 2). These are in turn assigned to the three IPCC factors: exposure, sensitivity and adaptive capacity [21,22].

Dichotomous sub-components are expressed as the proportion of households. Continuous ones are normalised by the min-max method:-

$$\text{index}_{S_v} = (S_v - S_{\min}) / (S_{\max} - S_{\min}) \quad (2)$$

where S_v is the value observed for unit v (commune, arrondissement or household) and $S_{\min}$ and $S_{\max}$ are the extreme values in the sample. Three variables are continuous: the number of displacements in the last 12 months (capped at 6), the dependency ratio, defined as people under 18 and over 59 divided by people aged 18 to 59 (capped at 8), and an inverse diversification index:

$$\text{ID} = 1 / (N_{\text{act}} + 1) \quad (3)$$

where N_{act} is the number of distinct income-generating activities reported. The food consumption score (FCS) follows the World Food Programme method [23]:-

$$\text{FCS} = \sum_i a_i \cdot x_i \quad (4)$$

where x_i is the number of days food group i was eaten in the previous seven days and a_i its weight (2 for cereals and tubers, 3 for pulses, 1 for vegetables and for fruit, 4 for meat, eggs and milk, 0.5 for sugar and oil). An FCS of 35 or less indicates poor (≤ 21) or borderline (21.5–35) consumption. A water source is classed as unimproved when it is an unprotected well, surface water or an unspecified spring. Water-fetching time is twice the one-way travel time plus queuing time, compared with the 30-minute threshold of the Joint Monitoring Programme [24].

Each major component M is the arithmetic mean of its n sub-components, and the LVI is the mean of the components weighted by their number of sub-components w_{Mi} :-

$$M_v = \sum_i \text{index}_{S_{v,i}} / n \quad (5)$$

$$\text{LVI}_v = \sum_i w_{Mi} \cdot M_{vi} / \sum_i w_{Mi} \quad (6)$$

The index runs from 0 (no vulnerability) to 1 (maximum vulnerability). For the IPCC variant, each contributing factor CF (exposure e , sensitivity s , adaptive capacity a) is computed the same way from its own components:-

$$\text{CF}_v = \sum_i w_{Mi} \cdot M_{vi} / \sum_i w_{Mi} \quad (7)$$

$$\text{LVI-IPCC}_v = (e_v - a_v) \times s_v \quad (8)$$

The adaptive-capacity sub-components point towards vulnerability, so a is taken as one minus their weighted mean, so that a high value means high capacity, as equation (8) assumes. The LVI-IPCC ranges from -1 to $+1$, and a

negative value means that declared adaptive capacity exceeds exposure. Indices are computed by commune, by arrondissement and by status.

Building the typology:-

The household typology rests on a multiple correspondence analysis (MCA) followed by an ascending hierarchical classification, a standard route for exploring questionnaire data [25,26]. Sixteen active variables covering the eight LVI components were retained: attack, destruction of property, dispossession, livestock status (owned, entrusted, lost, never owned), FCS class, number of adult meals, water source, sanitation, shelter condition, overcrowding, access to land, main activity (agropastoral, trade and crafts, day labour, precarious), sex of the household head, assistance received, support from a host household, and eroding coping strategies. Commune, arrondissement and status were treated as illustrative variables. Inertia rates were corrected following Benzécri [27], and households were classified with Ward's criterion [28] on their coordinates on the leading axes. The number of classes was chosen from the jumps in the aggregation index and from the readability of the classes, and the partition was then consolidated with k-means. Classes are described by their over-represented categories. A second classification, at arrondissement level, applied Ward's method to the standardised scores of the eight components of the thirteen arrondissements.

Statistical tests and triangulation:-

Differences between communes in proportion-based sub-components were tested with the χ^2 test using Yates' continuity correction, or Fisher's exact test when an expected count fell below 5. Composite scores and continuous sub-indices are compared descriptively.

The association between types and commune or status was tested with the χ^2 test and measured with Cramér's V:-

$$V = \sqrt{[\chi^2 / (N \cdot (\min(l, c) - 1))]} \quad (9)$$

where l and c are the numbers of rows and columns of the contingency table. Computations were done in Python (pandas, SciPy, scikit-learn, prince). Quantitative results were checked against the summaries of the focus groups and key informant interviews of the same assessment.

Results:-

A similar level of vulnerability in both communes:-

Table 2 gives the sub-components and the major components of the LVI for each commune, with the result of the test of difference where one applies.

Table 2. Components and sub-components of the LVI by commune

Component / sub-component	Banikoara (n = 94)	Matéri (n = 156)	p
EXPOSURE			
Security shocks	0.136	0.120	–
Household victim of an attack (%)	0.181	0.160	0.805 ns
Household victim of threats (%)	0.181	0.179	1.000 ns
Death linked to insecurity in the household (%)	0.074	0.096	0.722 ns
Household member missing (%)	0.106	0.045	0.107 ns
Asset losses and forced mobility	0.229	0.287	–
Arbitrary dispossession of property (%)	0.085	0.192	0.035 *
Destruction of property (%)	0.160	0.314	0.010 *
Livestock stolen or killed (%)	0.372	0.250	0.056 ns
Number of displacements in 12 months (index)	0.114	0.097	–
Access to land hindered by insecurity (%)	0.415	0.583	0.014 *
SENSITIVITY			
Food	0.684	0.710	–
Poor or borderline food consumption score (%)	0.862	0.872	0.972 ns
Adults eating one meal a day or less (%)	0.000	0.301	< 0.001 ***
No food stock or savings (%)	0.904	0.814	0.082 ns
Reduced number of meals over 7 days (%)	0.968	0.853	0.007 **

Component / sub-component	Banikoara (n = 94)	Matéri (n = 156)	p
Water and sanitation	0.794	0.673	–
Unimproved drinking-water source (%)	0.734	0.378	< 0.001 ***
Water-fetching trip over 30 min round trip (%)	0.840	0.872	0.614 ns
Open defecation (%)	0.809	0.769	0.567 ns
Housing and basic services	0.750	0.712	–
Shelter damaged or uninhabitable (%)	0.904	0.859	0.393 ns
Overcrowded shelter (%)	0.798	0.776	0.799 ns
Health care distant or inaccessible (%)	0.681	0.705	0.793 ns
School distant or inaccessible (%)	0.617	0.506	0.116 ns
ADAPTIVE CAPACITY			
Sociodemographic profile	0.178	0.230	–
Dependency ratio (index)	0.233	0.285	–
Female-headed household (%)	0.234	0.359	0.054 ns
Head under 25 or 60 and over (%)	0.106	0.115	0.991 ns
Household with a disabled member (%)	0.138	0.160	0.774 ns
Livelihood strategies	0.500	0.429	–
Precarious main activity (aid, begging, borrowing, none) (%)	0.128	0.109	0.808 ns
Inverse activity-diversification index	0.115	0.141	–
No access to farmland (%)	0.840	0.872	0.614 ns
No livestock owned at present (%)	0.862	0.654	< 0.001 ***
Eroding coping strategies (asset sales, cuts in health or school spending) (%)	0.553	0.372	0.008 **
Social networks and institutions	0.609	0.659	–
Not a member of a group or cooperative (%)	0.904	0.929	0.637 ns
Received no assistance (%)	0.223	0.301	0.233 ns
No support from a host household or family (%)	0.628	0.750	0.056 ns
Local conflict-resolution mechanisms absent or weakened (%)	0.681	0.654	0.764 ns
LVI	0.468	0.464	–

Values are proportions of households (0–1) or normalised indices. p: χ^2 test with Yates' correction, or Fisher's exact test when an expected count was below 5, for proportion-based sub-components; – : composite scores and continuous sub-indices are compared descriptively. *** p < 0.001; ** p < 0.01; * p < 0.05; ns: not significant. Source: household survey, Benin Red Cross, 2026.

The LVI is 0.468 in Banikoara and 0.464 in Matéri (0.466 for the two communes together): a moderate level, and for practical purposes the same one. The difference of 0.004 between the communes is small next to the gaps seen between components. The matching totals hide different profiles. Banikoara scores higher on water and sanitation (0.794 against 0.673), housing and services (0.750 against 0.712) and livelihood strategies (0.500 against 0.429). Matéri scores higher on food (0.710 against 0.684), asset losses (0.287 against 0.229), sociodemographic profile (0.230 against 0.178) and social networks (0.659 against 0.609). Direct security shocks are similar (0.136 and 0.120): in both communes about one household in six reports an attack, and about as many report threats.

Several sub-components show clear contrasts. In Matéri, 30.1% of households say that adults eat one meal a day or less; none of the 94 households of Banikoara say so, although almost all of them (96.8%) cut the number of meals during the past week (p = 0.007). Destruction of property (31.4% against 16.0%, p = 0.010), dispossession (19.2% against 8.5%, p = 0.035) and access to land hindered by insecurity (58.3% against 41.5%, p = 0.014) are all more common in Matéri. Banikoara stands out for its reliance on unimproved water sources (73.4% against 37.8%, p < 0.001), for having no livestock (86.2% against 65.4%, p < 0.001) and for eroding coping strategies (55.3% against 37.2%, p = 0.008). Livestock theft (37.2% against 25.0%) and female headship (35.9% against 23.4%) lean the same way as in the larger needs assessment but stop just short of significance at this sample size (p = 0.056 and 0.054). Three deficits are large and shared: no access to farmland (86% of all households), a water trip longer than 30 minutes (86%) and no membership of any group (92%).

Sensitivity is the dominant factor:-

Figure 2 compares the profile of the eight components in the two communes, and Figure 3 shows the three IPCC contributing factors.

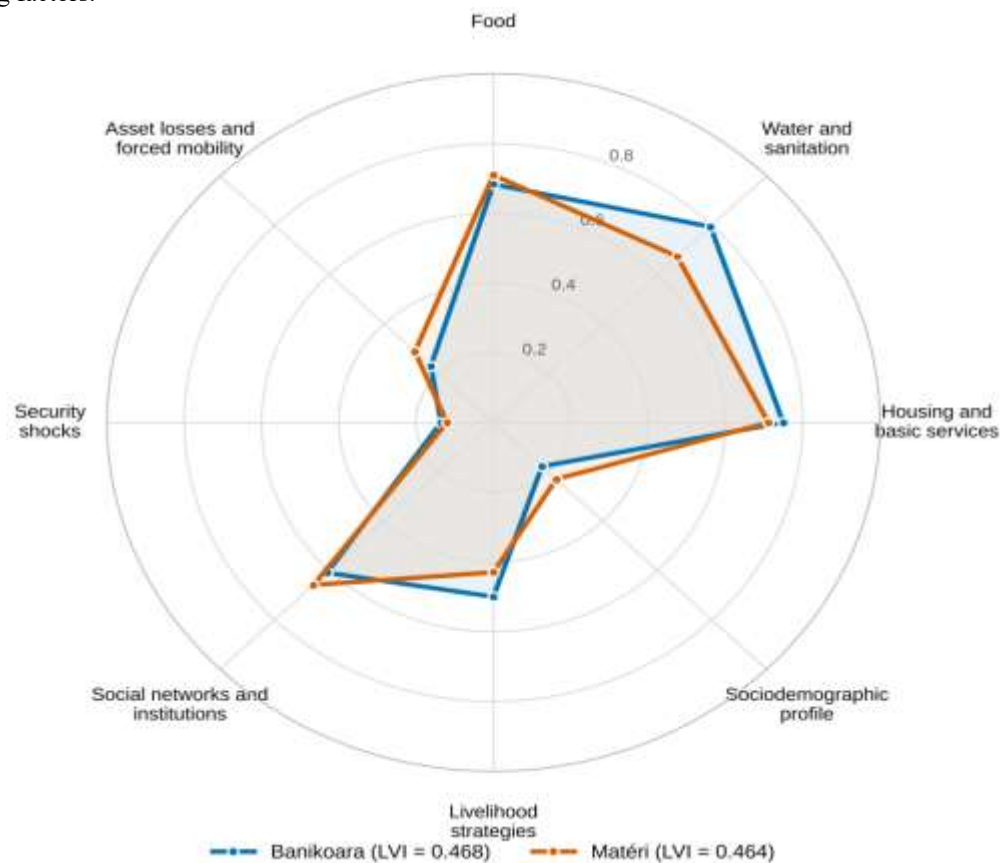


Figure 2. Profile of the major LVI components in Banikoara and Matéri.

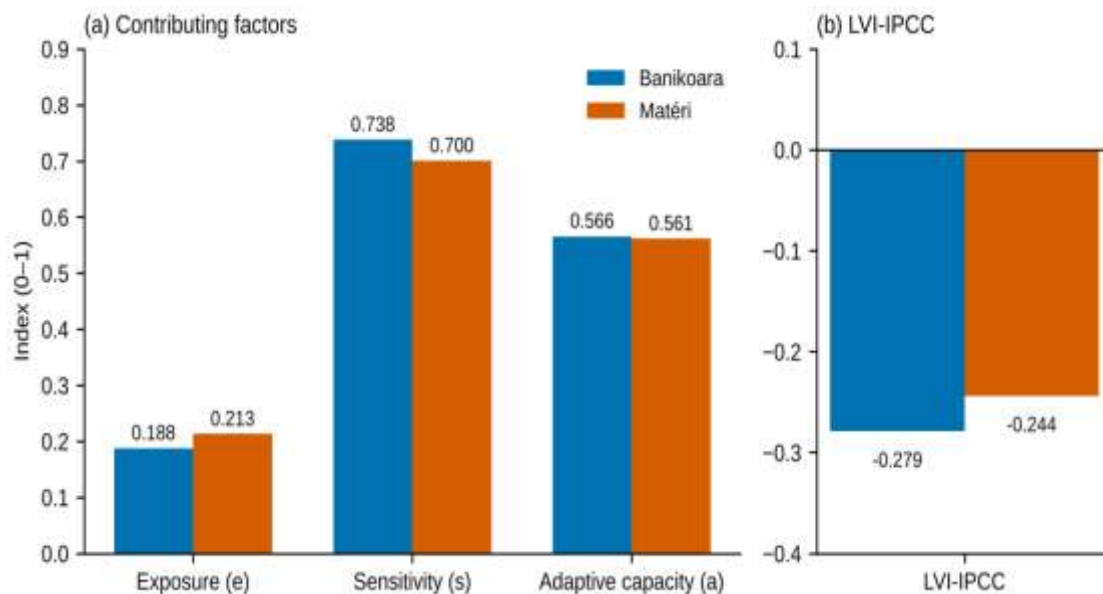


Figure 3. Contributing factors and LVI-IPCC by commune.

The two profiles overlap for the most part. Both stretch towards food, water and housing, and both stay close to the centre for security shocks and sociodemographic profile. Sensitivity (0.738 in Banikoara, 0.700 in Matéri) is far above exposure (0.188 and 0.213). Adaptive capacity sits in between (0.566 and 0.561). The LVI-IPCC is negative in both communes (-0.279 and -0.244), slightly less so in Matéri, where exposure is higher. A negative value does not mean households are safe. It means that direct shocks, reported by a minority, weigh less in the index than the chronic deficits in living conditions that affect most households. What the index measures is mainly the erosion of living conditions, while exposure to violence stays concentrated in a subgroup.

Contrasts between arrondissements and between statuses:-

Figure 4 shows the major components and the LVI of the thirteen arrondissements, ranked by decreasing vulnerability, and Table 3 adds the IPCC factors and the group from the sub-communal classification. Arrondissement subsamples are small (5 to 40 households), so this part is exploratory.

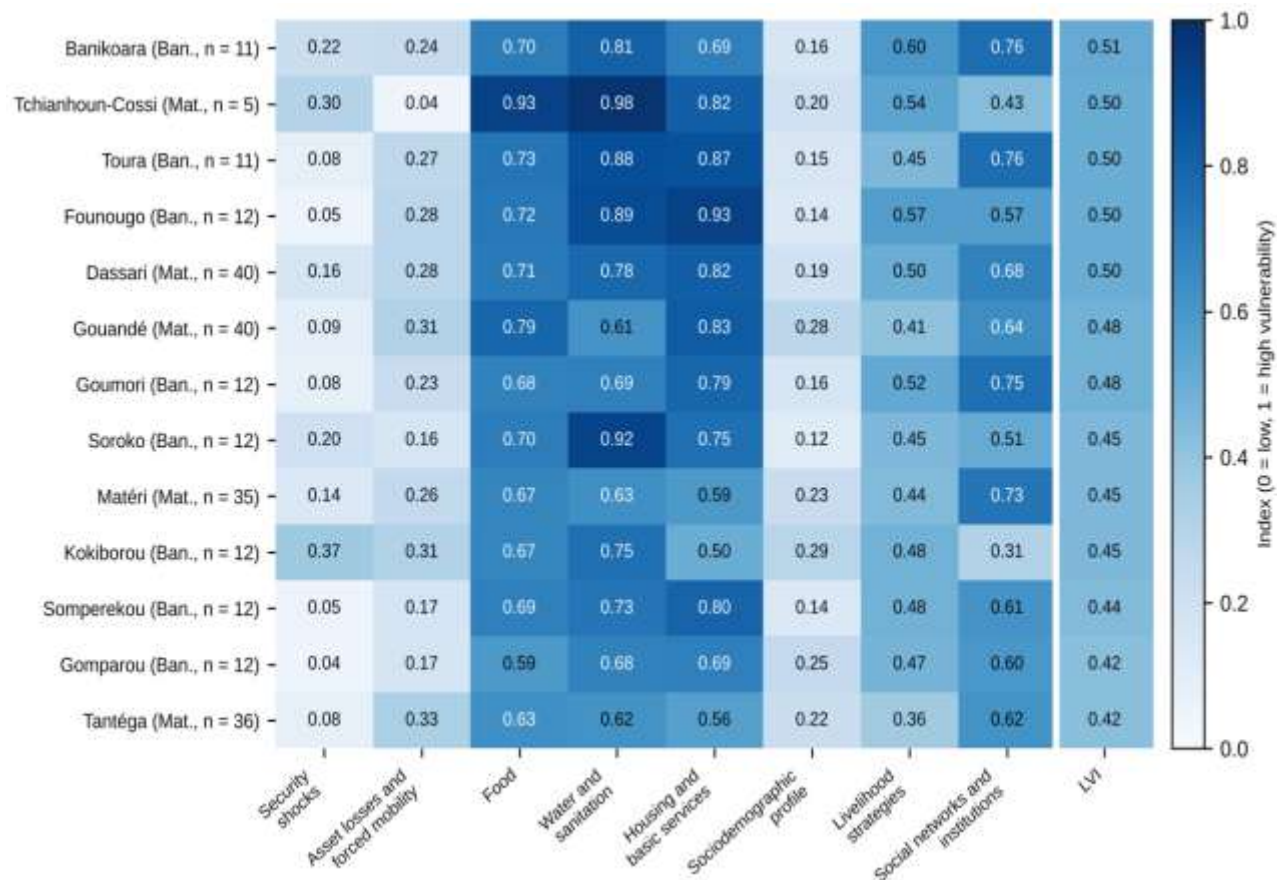


Figure 4. Major components and LVI by arrondissement (n = number of households surveyed).

Table 3. LVI, contributing factors and typological group of the arrondissements

Arrondissement	Commune	n	e	s	a	LVI	LVI-IPCC	Grou p
Banikoara	Banikoara	11	0.234	0.731	0.488	0.509	-0.185	G3
Tchianhoun-Cossi†	Matéri	5	0.158	0.904	0.597	0.503	-0.397	G4
Toura	Banikoara	11	0.187	0.821	0.549	0.502	-0.298	G3
Founougo	Banikoara	12	0.178	0.842	0.564	0.501	-0.325	G3
Dassari	Matéri	40	0.225	0.767	0.541	0.498	-0.242	G3
Gouandé	Matéri	40	0.211	0.754	0.560	0.482	-0.263	G1
Goumori	Banikoara	12	0.167	0.721	0.519	0.476	-0.253	G3
Soroko	Banikoara	12	0.175	0.779	0.633	0.452	-0.356	G3
Matéri	Matéri	35	0.206	0.631	0.537	0.449	-0.208	G1

Arrondissement	Commune	n	e	s	a	LVI	LVI-IPCC	Group
Kokiborou	Banikoara	12	0.336	0.630	0.629	0.448	-0.184	G2
Somperekou	Banikoara	12	0.117	0.739	0.583	0.443	-0.344	G3
Gomparou	Banikoara	12	0.115	0.651	0.556	0.423	-0.287	G1
Tantéga	Matéri	36	0.217	0.604	0.602	0.417	-0.232	G1

e: exposure; s: sensitivity; a: adaptive capacity. G1: moderate vulnerability, mainly food; G2: high exposure offset by social networks; G3: water and housing service deficit; G4: combined food and water deficit. † Fewer than 10 households: reported for completeness, not interpreted. Source: household survey, Benin Red Cross, 2026.

The LVI runs from 0.417 in Tantéga to 0.509 in Banikoara town. The classification of arrondissements gives four groups. The largest, G3, brings together six arrondissements of Banikoara (Banikoara, Founougo, Goumori, Somperekou, Soroko, Toura) and Dassari in Matéri. It is marked by very high scores for water and sanitation (0.69 to 0.92) and for housing (0.69 to 0.93). G1 (Gouandé, Matéri, Tantéga and Gomparou) is less vulnerable, led by food and weak social networks. Kokiborou (G2) has the highest exposure to shocks ($e = 0.336$) and the strongest networks (a deficit of only 0.31 on that component), which brings its LVI back to the average. Tchianhoun-Cossi (G4) has extreme food (0.93) and water (0.98) scores, but only five households were interviewed there and these figures should be read with care.

By status, the mean household LVI is 0.427 for host families, 0.477 for IDPs and 0.496 for refugees and asylum seekers. The gradient is the same in both communes, but the top of the ranking changes: IDPs are the most vulnerable in Banikoara (0.500) and refugees in Matéri (0.502). Host families are less vulnerable, yet their sensitivity scores are high (0.734 in Banikoara). Focus groups say the same thing. Hosts share rooms, land, water and utensils, and eight of the ten groups of host women reported more pressure on basic services [18].

Four types of household:-

The typology produced four classes of 43, 36, 96 and 75 households. Table 4 lists the discriminating indicators of each type, its composition by status and its share in each commune.

Table 4. Profile of the four household types

Indicator	T1 Direct victims	T2 Preserved livelihoods	T3 Water and housing stress	T4 Severe food insecurity
Households (n)	43	36	96	75
Share of the sample (%)	17.2	14.4	38.4	30.0
Mean household LVI	0.520	0.329	0.472	0.490
Mean FCS	20.8	37.7	24.6	15.5
Victim of an attack (%)	56.3	2.5	10.2	7.3
Dispossession of property (%)	73.6	10.1	2.1	2.3
Destruction of property (%)	92.4	13.4	14.8	10.0
Adults eating at most one meal a day (%)	19.4	1.7	2.8	51.2
Unimproved water (%)	33.3	13.4	77.8	40.0
No access to land (%)	93.1	52.1	87.3	98.1
Eroding coping strategies (%)	35.4	38.7	64.4	24.2
Female-headed household (%)	32.6	26.1	18.7	48.8
No support from a host household (%)	45.1	90.8	58.1	91.2
Host / IDP / refugee households (n)	6/13/24	22/4/10	45/21/30	27/12/36
Banikoara households in the type, n (%)	12 (12.8)	13 (13.8)	58 (61.7)	11 (11.7)
Matéri households in the type, n (%)	31 (19.9)	23 (14.7)	38 (24.4)	64 (41.0)

Percentages are shares of households within each type. Source: household survey, Benin Red Cross, 2026; MCA and hierarchical classification.

Type 1, direct victims of violence and dispossession (17.2%). Of these households, 92.4% suffered property destruction, 73.6% dispossession and 56.3% an attack, far above the sample as a whole (25.6%, 15.2% and 16.8%). Refugees make up 55.8% of the type and IDPs 30.2%. More than half (54.9%) are supported by a host family, and

precarious activities are over-represented (23.6% against 11.6% overall). This is the most vulnerable type (LVI of 0.520). It combines shock, asset loss and a poor diet (FCS of 20.8).

Type 2, preserved livelihoods (14.4%). These households have a shelter in good condition (52.9%), an acceptable diet (52.9%), access to land (47.9%) and livestock (50.4%). They drink improved water (86.6%) and half have latrines (50.4%). Host families make up 61% of the type, which is the only one with a low LVI (0.329). Its share is about the same in the two communes (13.8% in Banikoara and 14.7% in Matéri), and it corresponds to host households that keep their productive base.

Type 3, water and housing stress with eroding coping strategies (38.4%). These households use unimproved water (77.8%), practise open defecation (90.8%) and live in damaged (95.1%) and overcrowded (90.1%) shelters. Their diet is limited (60.2% borderline) but adults eat at least twice a day, and 64.4% have sold assets or cut health or education spending. They are little exposed to direct violence, mostly headed by men (81.3%) and mostly agropastoral (77.5%). They make up 61.7% of the households of Banikoara.

Type 4, severe food insecurity, often female-headed (30.0%). Half of these households (51.2%) have adults who eat one meal a day at most, 80.8% have a poor diet (mean FCS of 15.5) and 98.1% have no access to land. Nearly one in two is headed by a woman (48.8%, against 31.2% in the sample). They rarely get help from a host family (91.2% without support) and seldom use eroding strategies (24.2%), probably because they have no assets left to sell. Uninhabitable shelters are twice as frequent as overall (19.2%). The type holds 41.0% of the households of Matéri and 36% of all refugee households.

Distribution of the types between communes and arrondissements:-

Figure 5 shows the share of each type in the thirteen arrondissements.

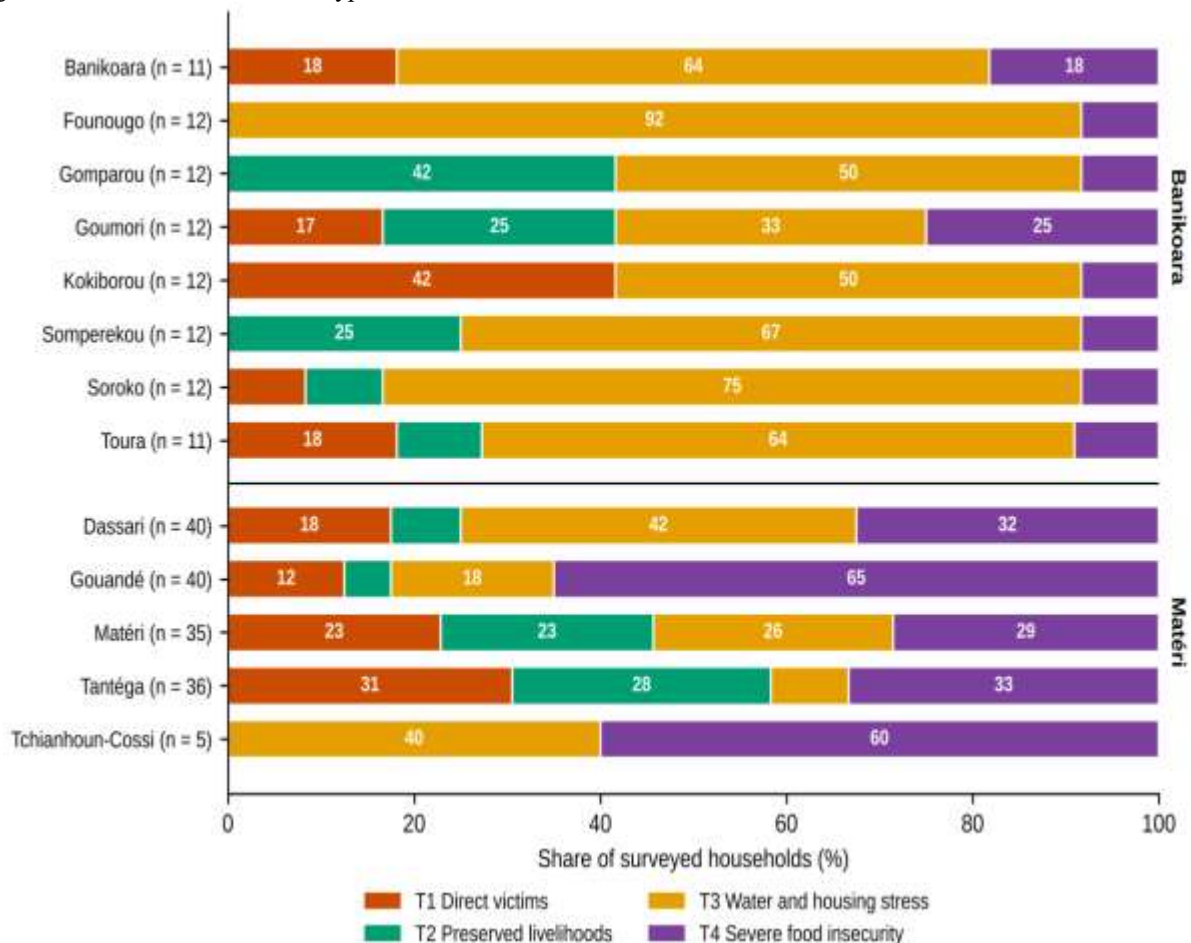


Figure 5. Distribution of household types by arrondissement.

The association between commune and type is strong ($\chi^2 = 39.9$, $df = 3$, $p < 0.001$; $V = 0.40$), and stronger than the association between status and type ($\chi^2 = 24.3$, $df = 6$, $p < 0.001$; $V = 0.22$). Territory separates the vulnerability profiles better than status does. In Banikoara, type 3 prevails in all arrondissements: 11 of 12 households in Founougo and 9 of 12 in Soroko. Kokiborou (5 of 12) and Banikoara town (2 of 11) hold the most direct victims, while Gomprou (5 of 12) and Somperekou (3 of 12) have the most preserved households. In Matéri, type 4 dominates in Gouandé (26 of 40) and Tchianhoun-Cossi (3 of 5). Tantéga (11 direct victims and 10 preserved households out of 36) and Matéri town (8 of each out of 35) have a more mixed profile. Dassari sits between the two communes, with 17 type 3 and 13 type 4 households out of 40. Stated priority needs back up this geography. In Banikoara, food is the first need for 66.9% of households. In Matéri, livelihoods (46.8%) and shelter (21.7%) come first. Among type 4 households, shelter is the first need for 31.9%, three times the share in the other types.

Discussion:-

One level, two structures:-

The central result is the gap between the aggregate measure and the structure of vulnerability. With an LVI of 0.468 and 0.464, Banikoara and Matéri look equivalent. The decomposition and the typology show they are not. Composite indices that let one kind of deficit offset another are known to have this limit [14,22], and it is the reason for adding a classification, which restores the combination of deficits at household level. That sensitivity outweighs exposure agrees with findings from northern Ghana [13]: in both places, chronic living conditions weigh more than the shocks households report.

In Banikoara, vulnerability is mostly about infrastructure: unimproved water, missing sanitation, damaged shelters. The cotton basin keeps an active farm economy, which is what the weight of agropastoral type 3 households suggests, but these households sell assets and cut health or school spending to cope. Focus groups in Banikoara mention tontines and small trade, and key informants say remote villages (Kokiborou, Toura, Soroko) get less aid, with a language barrier on top [19]. Livestock loss is more frequent there than in Matéri (37.2% against 25.0%), which echoes the cattle thefts reported by herders.

In Matéri, vulnerability is first of all about food and demography. The influx of refugees and IDPs, older and larger there, comes with many female-headed households that have no land and no host support. Focus groups in Matéri report fewer meals in the community and recent arrivals not covered by cash assistance, and some herders think that "the Red Cross only comes for the displaced" [18]. The frequency of property destruction and of land access hindered by insecurity shows that the commune sits in direct contact with the violence front, in line with regional analyses [1,3].

Types that cut across status:-

Status explains part of the vulnerability, since refugees and IDPs are worse off than hosts, but it explains less than territory. 27% of host families fall in type 4, and 42% of IDPs fall in type 3, which is little exposed to direct violence. This fits requests made in the focus groups and interviews to include host communities in assistance [18,19]. Targeting on status alone would leave out host households in critical food situations and would include displaced households that keep their livelihoods. Work on displaced people in Colombia reached a similar conclusion: asset loss and access to land explain vulnerability better than administrative status [11].

Type 1 needs particular attention. It groups households who lived violence directly, and its share is higher in Matéri (19.9%) than in Banikoara (12.8%). Beyond the lack of resources, these households have a protection problem (lost documents, missing relatives, need for psychosocial support), a dimension that livelihood approaches tend to neglect in conflict settings [10].

Implications for targeting:-

The typology points to different responses. For type 3, dominant in Banikoara, investment in drinking water, sanitation and shelter repair, together with support for productive assets so that fewer households need to sell them. For type 4, dominant in Gouandé and Tchianhoun-Cossi, direct food assistance, shelter support and income-generating activities aimed at female heads of household, with negotiated access to land. For type 1, protection support (civil registration, psychosocial care, referral) and rebuilding of lost assets. Type 2 households, mostly hosts, can act as relays and carry mutual-aid arrangements if they are supported themselves. Targeting by profile, crossed with the arrondissement, also answers the Do No Harm warnings recorded in the assessment: jealousy at distributions, exclusion of hosts, and little information on criteria.

Conclusion:-

In Matéri and Banikoara, two border communes of northern Benin hit by insecurity, livelihood vulnerability is moderate and nearly identical (LVI of 0.46 to 0.47), and it is driven by sensitivity rather than by direct exposure to violence. The starting hypothesis holds: at the same level, the two communes differ in the structure of their vulnerability. Four household types were identified. Banikoara is dominated by agropastoral households under water and housing stress who draw on their assets. Matéri is dominated by households in severe food insecurity, often female-headed and landless. Direct victims of violence and dispossession form a type of their own that exists in both communes, and a minority of mostly host households keep their livelihoods. Territory separates these profiles better than status does. Humanitarian actors and local authorities should move from targeting by status to targeting by profile and arrondissement. Future work should follow how these types change over time, extend the analysis to other communes covered by the assessment, such as Kalalé, and test the typology under other weighting schemes, ideally on a larger sample.

Acknowledgements:-

We would like to express our sincere gratitude to the Benin Red Cross for facilitating access to the data from the multisectoral needs assessment, as well as to the households and enumerators who participated in the survey.

Ethics statement:-

Informed consent was obtained from all respondents prior to the interviews.

Conflict of interest:-

We, the authors, declare that we have no conflicts of interest.

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