IOM LIBYA

SOLUTIONS AND MOBILITY INDEX IN LIBYA

AN ASSESSMENT OF THE STABILITY OF AREAS OF RETURN AND DISPLACEMENT IN LIBYA

January 2024

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DTM

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IOM's Displacement Tracking Matrix (DTM) tracks and monitors population movements in order to collate, analyze and share information to support the humanitarian community with the needed demographic baselines to coordinate evidence-based interventions.

To consult all DTM Libya reports, datasets, static and interactive maps and dashboards, please visit:

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KEY FINDINGS

AVERAGE STABILITY INDEX SCORE (NATIONAL LEVEL) = 69.6

- The evidence in this report does not support the hypothesis that areas with higher populations of returnees have higher Stability Index scores

ACCESS TO SERVICES AND LIVELIHOODS

• Communities with most or about half of residents having both utilities (mean SI = 73.1) exhibit higher stability index scores than those with less than half or no residents with both utilities (mean SI = 62).

• Communities with similar status as rural or urban do not face the same issues with access to services across the board. Programs should target based on specifics in each rural community.

• Communities with more open small businesses show a 1.7 times higher likelihood of residents finding employment, while those with most or all large businesses open have a 2.5 times higher likelihood.

• The digital divide in terms of access to Information, Communication Technology (ICT) is evident in rural communities compared to urban communities, with implications for disaster risk reduction measures (i.e. Early Warning Systems).

SOCIAL COHESION

• Communities in eastern Libya exhibit the highest level of apprehension regarding explosive devices while simultaneously registering the lowest levels of concern regarding armed violence.

• Just over 1 in ten (13%) of communities highlight the need for reconciliation, mostly in southern Libya.

• Among communities expressing the need for reconciliation mechanisms over one third (37.5%) cite concerns over communal tensions, followed by 20.8% expressing challenges in accessing formal and informal conflict resolution forums.

Civil society organizations are actively present in 77.4 percent of surveyed communities, with a stronger presence in the East (86%) and South (81.1%) geodivisions.

DISASTER RISK REDUCTION MEASURES

• Over two in five (43.1%) key informants reported that their communities experienced hazards in the last two years.

• Drought was the predominant hazard, affecting nearly one quarter of the communities assessed. Flash floods or floods were reported in 8.5 per cent of communities assessed.

Top three impacts of evolving weather conditions in communities assessed, as reported by key informants

77%
OF COMMUNITIES HAVE NOT IMPLEMENTED ADAPTIVE MEASURES WHERE HAZARDS ARE PRESENT

• Communities grappling with flash floods or floods exhibit a significant gap, with only two out of 29 affected communities implementing mitigation measures.

• In drought-affected communities that have not implemented specific measures, key informants report this is primarily due to a lack of knowledge (44% of communities) and the perception that the issue is too large to address independently (25%), emphasizing the need for education and collaborative solutions with external support.

20%
OF KEY INFORMANTS REPORTED THEIR COMMUNITY'S INFRASTRUCTURE IS RESILIENT TO HAZARDS

01. INTRODUCTION

DISPLACEMENT AND RETURN DYNAMICS IN LIBYA

Internal displacement in Libya is broadly characterized as being concentrated around coastal urban areas with no official large-scale camps. This leads to spontaneous, unaided returns, highlighting the importance of considering aspirations and capabilities of displaced families, alongside structural factors like urban development in coastal cities and underdevelopment in underserved areas. IDPs often navigate displacement and return to areas grappling with chronic underdevelopment, marked by critical infrastructure deficiencies and the erosion of public services. The challenges faced by IDPs also pertain to economic growth, with a shrinking agricultural sector, and labour market integration.

Against this background, In the aftermath of the October 2020 ceasefire, several localised escalations in hostilities and armed clashes during 2022 and the first half of 2023 did not result in new internal displacement. Rather, these limited hostilities indicated that despite a fragile security situation, overall, insecurity has not continued to be a principal driver of displacement in Libya. Apart from Murzuq in southern Libya, there are no specific area wide reports on prevailing insecurity that could be linked to internal displacement or identified as preventing the returns of IDPs. Due to improvements in the security situation, the number of returnees steadily increased, with 705,426 individuals returning in early 2023.

Nevertheless, Storm Daniel, which made landfall in northeastern Libya in September 2023 had a devastating impact and created a new wave of displacement among the Libyan and migrant population. Key informants in various communities indicated that the preferred durable solution to flood-induced displacement resulting from Storm Daniel is returning to locations of origin.

OBJECTIVES OF THIS REPORT

In consideration of its Internal Displacement Strategy, IOM developed this Solutions and Mobility Index (SMI) Report to further support with data initiatives around fragility, solutions and mobility.

As such, this SMI report will help to:

- **Identify pockets of stability** and high mobility and conditions conducive for strengthened resilience and Durable Solutions.
- **Provide evidence-based analysis** to better capture opportunities to strengthen seeds of stability.
- **Inform tailored interventions** in response to local initiatives across programme areas.
- **Facilitate the development of localized interventions and projects**: area-specific projects based on infrastructure assessments and influential factors identified by the SMI.
- **Advance regional or cluster analysis**: Cluster analysis may offer a more detailed approach to stability programming.
- **Provide trends analysis:** Regular rounds of data collection means the evolutions of a location's stability can be observed over time.

Note on language

For the purpose of this report the expressions Solutions and Mobility Index and Stability Index are used interchangeably and should be considered as being equivalent.


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02. OVERVIEW OF THE STABILITY INDEX

The Stability Index (SI) is a composite indicator that connects humanitarian response with transition and recovery efforts, assessing security, access to services, livelihoods, social cohesion and disaster risk reduction measures in locations of return, resettlement, and integration. The analysis aims to offer evidence-based insights into factors contributing to stability and produce a numeric stability index for the country's municipalities, facilitating data-driven policy-making and informing the programmatic activities of the Government, IOM, and other partners.

This report presents analysis on the Stability Index for all 100 municipalities (*baladiyat*) in Libya, combining nine sub indicators to estimate a score for each municipality. These indicators are based on data collected through interviews with key informants conducted between June and September 2023 across 100 municipalities (*baladiyat*) in Libya using both in-person and phone interviews. Multiple key informants from different communities (*muhallas*) were interviewed in each municipality (*baladiya*), thus the results represent snapshots of community-level information as of mid-year 2023. The key informants included IDP and returnee leaders, community workers, civil society representatives, among others.

03. METHODOLOGY

DATA COLLECTION

The interview questions for key informants were designed to cover three core themes key to evaluating the stability of an area to ensure solutions are durable: livelihoods and access to services, social cohesion; and disaster risk reduction measures in all 100 municipalities in Libya. These themes were derived from the Inter Agency Standing Committee (IASC) framework for durable solutions in combination with contextual insights on human mobility in Libya from DTM Mobility Tracking exercises. The table below shows a selection of the main sub-indicators used in the analysis of the Stability Index for each key theme (See *Appendix A. Survey Questions by Theme* for a full breakdown of all sub indicators collected in the interviews).

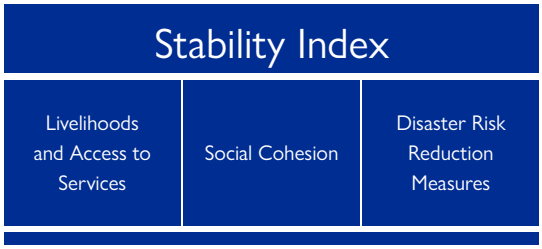


Table 1 Selection of sub indicators used to calculate the Stability Index according to key themes

Livelihoods and Access to Basic Services	Social Cohesion	Disaster Risk Reduction Measures
Presence of facilities (universities, banks, hospitals market areas, etc)	Concern about communal tensions in the location or neighborhood	Observations on changes in weather patterns over the last 10-30 years in this community
Access to electricity and other public services	Access to formal or informal conflict resolution forums	Hazards occurring with the highest frequency in the last two years
Operational status of small businesses (private sector)	Operational status of civil society organizations in the area	Proportion of land that can be affected by hazards

CALCULATING THE STABILITY INDEX IN LIBYA

As the data collected represents community-level information, the Stability Index is first calculated for communities (*muhallas*) and then aggregated to municipality (*baladiya*) and region (*mantika*) levels. The construction of the index is done in three stages outlined after the findings by key theme section (*See Page 17, Methodology: SI Calculation for a description of the calculation process*). It should be noted that the logistic regression model indicates the degree of association, not causal relationships, between stability and explanatory variables.

04. STABILITY INDEX SCORES

NATIONAL AND REGIONAL (*MANTIKA*) SCORES

The Stability Index scores range from 0 (low stability) to 100 (high stability). Since more than three out of four communities in Libya are considered stable according to the adopted methodology, the national average SI for municipalities is 69.6[23]. However, when looking at the theme components of the Index, the averages for livelihood and access to services, social cohesion and disaster risk reduction measures are 77.8, 83.7 and 47.4 respectively, indicating that targeted programming for disaster risk reduction is key to ensuring areas of return remain stable.

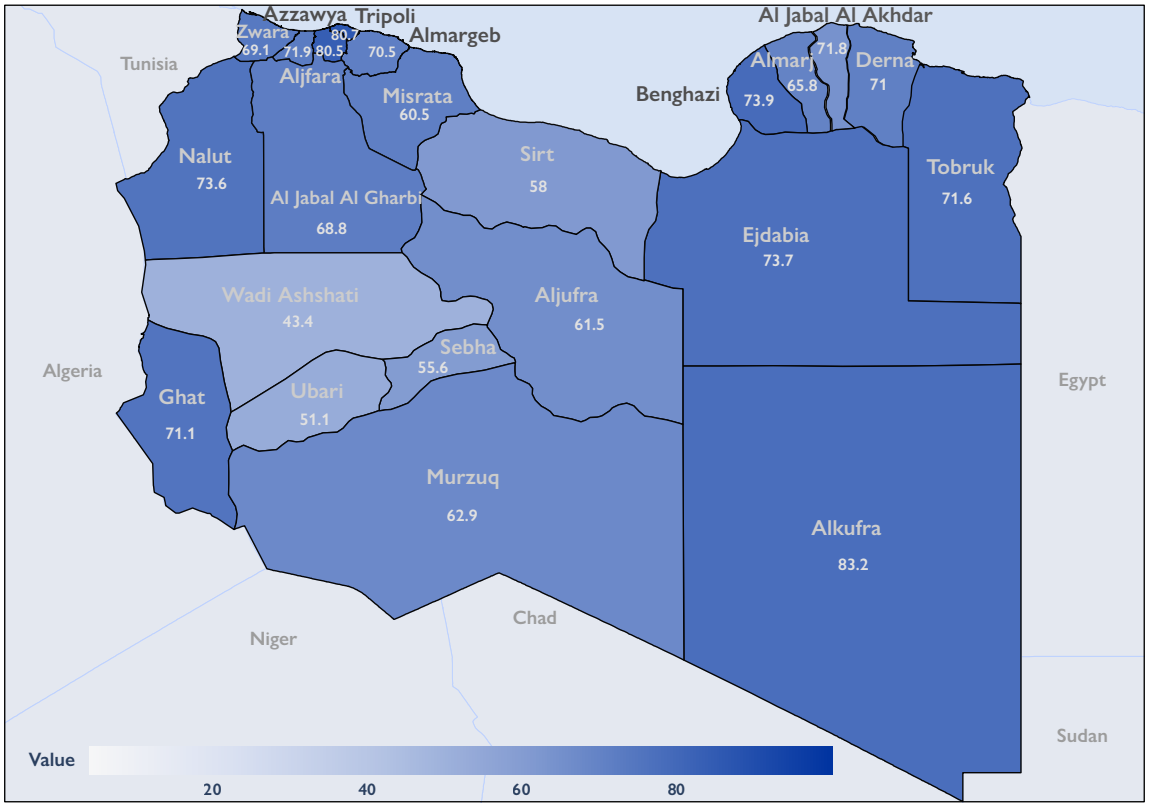
According to Libya's geodivisions, the East (SI=72.7) and West (SI=71.7) of the country have higher average stability index scores than the South (SI=56.2). As shown in Table 2, the South scores lower across all three themes, with a particularly low livelihood component. Variations on the regional (*mantika*) level are displayed in Figure 1.

Table 2 Stability Index and Components for Geodivisions in Libya (East, West, South)

Geodivision	Stability Index	Livelihood Component	Social Cohesion Component	Disaster Risk Reduction Measures Component
East	72.7	84.3	88.3	45.4
West	71.7	78.7	85.8	50.6
South	56.2	62.7	67.3	38.5

Fig 1 Stability Index and Components for Regions (*mantikas*) in Libya

Stability Index

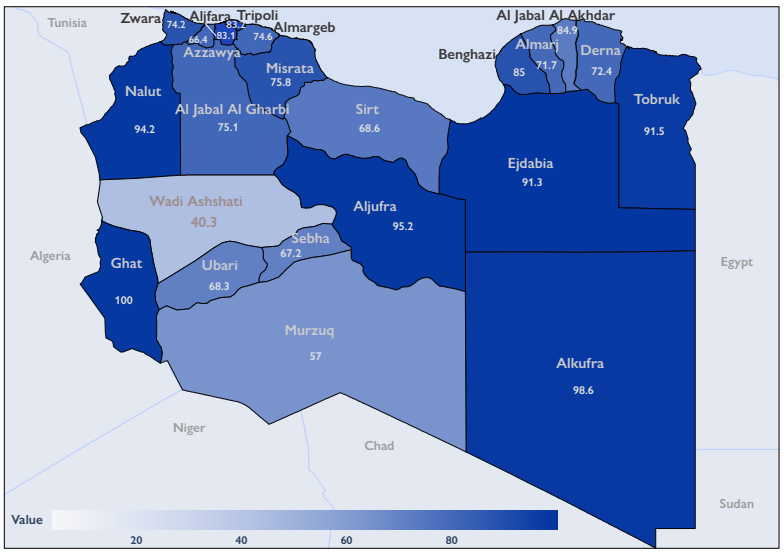


All maps are for illustration purposes only. Names and boundaries on this map do not imply endorsement or acceptance by IOM.

[2] National, regional and mantika level scores were calculated by averaging municipality (*baladiya*) scores. Unlike in the aggregation from communities to municipalities where the harmonic mean was used, the arithmetic mean was used here to make interpretation and validation of results clearer and easier.

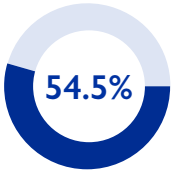
Fig 1 [Continued] Stability Index and Components for Regions (*mantikas*) in Libya

Livelihood and Access to Services Component



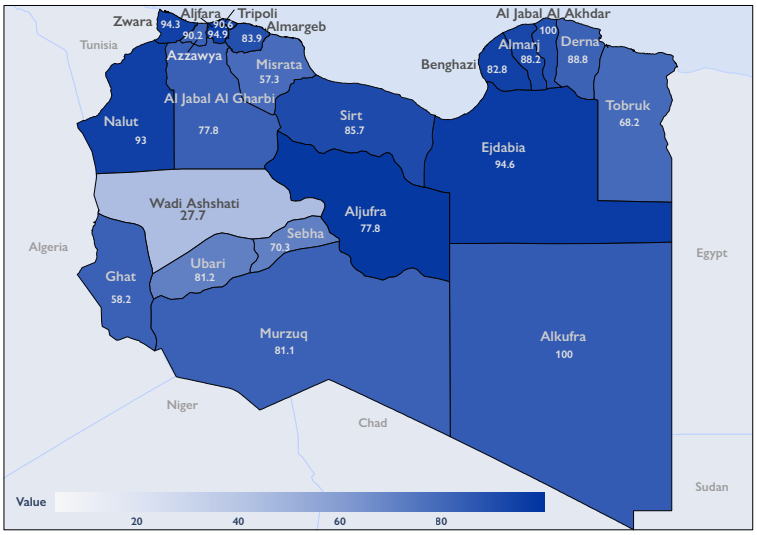
AVERAGE SCORE (*MANTIKA*)

78.1



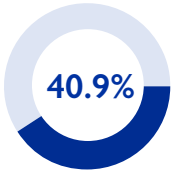
OF REGIONS (***MANTIKAS***) WERE BELOW THE AVERAGE SCORE

Social Cohesion Component



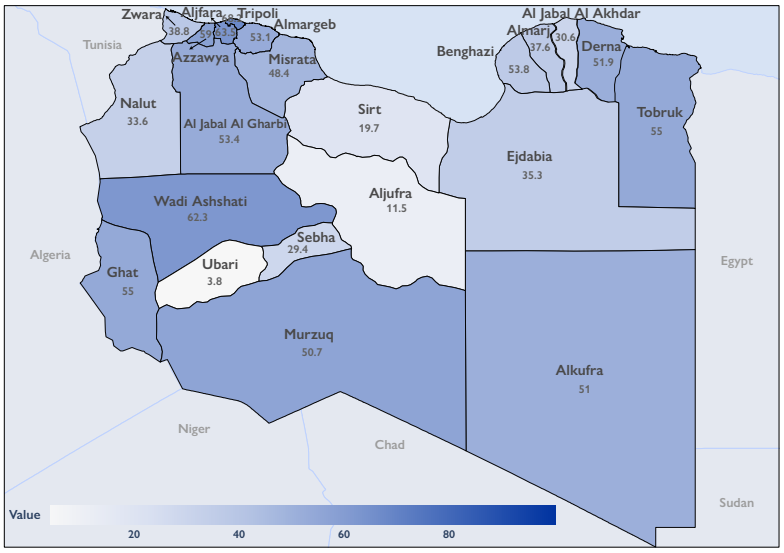
AVERAGE SCORE (*MANTIKA*)

81.2



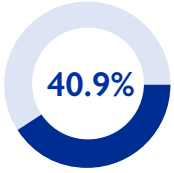
OF REGIONS (***MANTIKAS***) WERE BELOW THE AVERAGE SCORE

Disaster Risk Reduction Measures Component



AVERAGE SCORE (*MANTIKA*)

43.9

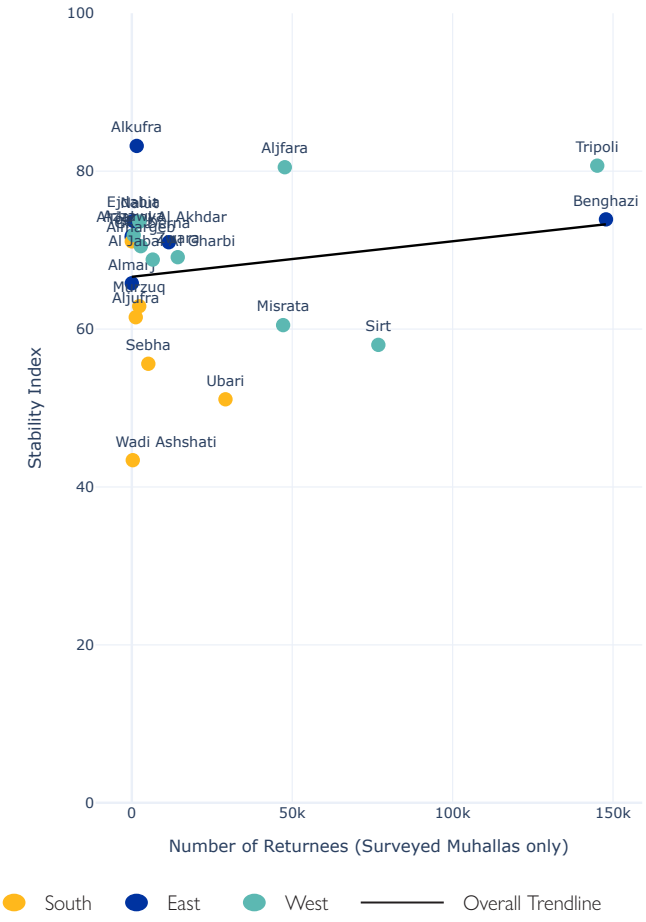


OF REGIONS (***MANTIKAS***) WERE BELOW THE AVERAGE SCORE

While there may appear to be a trend suggesting that regions (*mantikas*) with larger numbers of returnees, such as Benghazi, Tripoli, and Aljfara regions, exhibit higher values for the Stability Index (Figure 2), this relationship lacks statistical significance. In other words, the available evidence does not sufficiently support the hypothesis that areas with more returnees are inherently more 'stable.' This suggests that programmatic interventions are necessary to facilitate sustainable returns. This finding holds true for the number of internally displaced persons (IDPs) as well, although it is not explicitly depicted.

In fact, the logistic regression analysis detailed in the preceding section underscores that there is no statistically significant relationship between the number of IDPs and the perceived stability of a community. This conclusion remains robust even when considering other variables like hospitals, market areas, and others (refer to Table 11 for a comprehensive list of statistically significant variables). Therefore, the decision to return to a particular area does not necessarily depend on its perceived stability alone, emphasizing the multifaceted nature of factors influencing population movements across Libya.

Fig 2 Trendline between the Number of Returnees and Stability Index at *Mantika* level



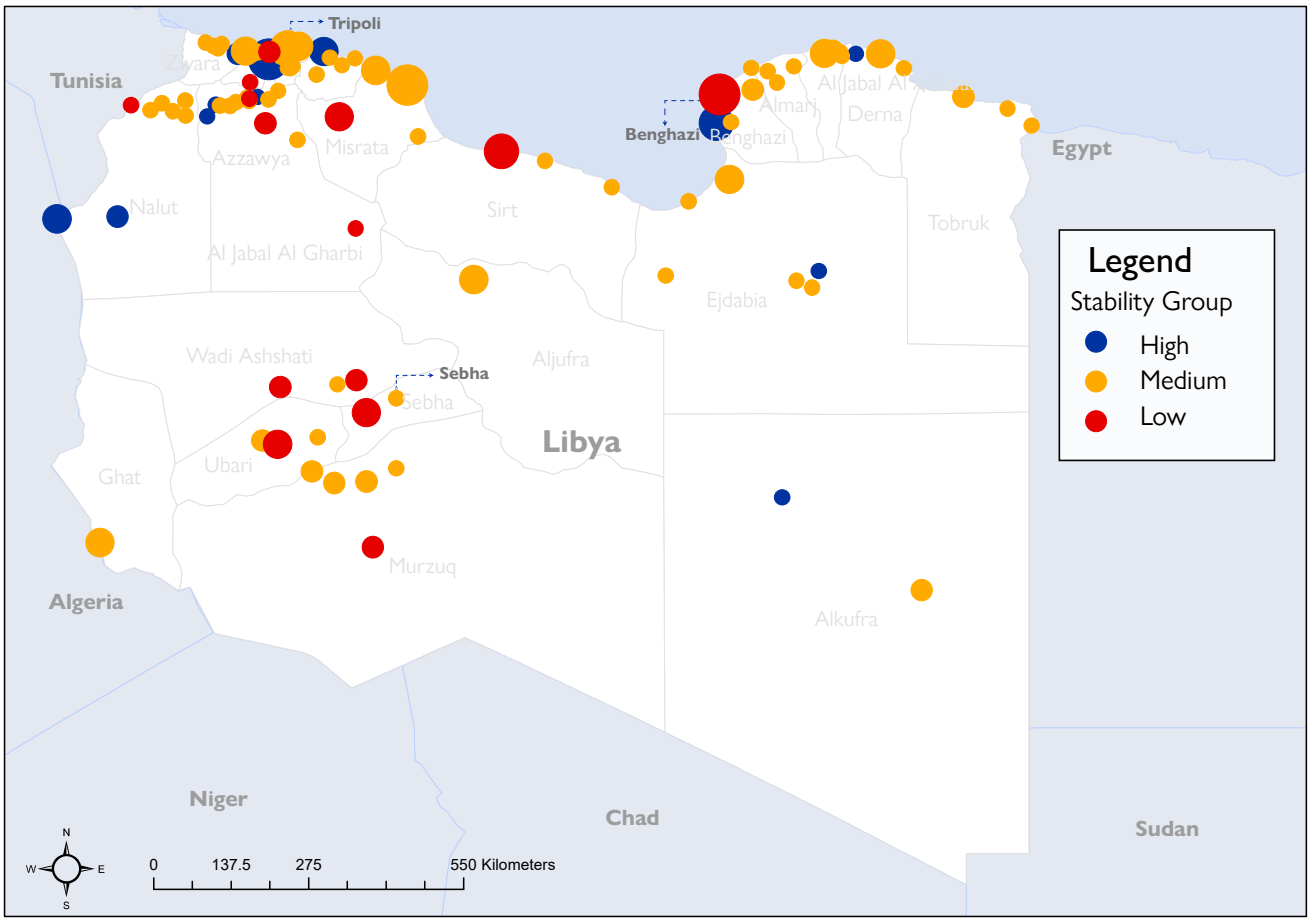
SI SCORES FOR MUNICIPALITIES

As mentioned in the methodology section, the Stability Index for municipalities (*baladiyat*) is derived by aggregating the corresponding SI scores for communities (*muhallas*). Based on the distribution of the scores, municipalities are further categorized into one of the three stability groups: low, medium and high. Municipalities whose SI scores are more than one standard deviation[4] (SD=18.6) away from the national average (mean SI=69.6) are assigned into "low" and "high" stability groups. Those below the national average score are assigned into "low" stability groups while those whose SI scores are more than one standard deviation above the national average score are assigned into "high" stability groups. All other municipalities are then assigned into "medium" stability groups. There are 14, 73 and 13 municipalities in "low", "medium" and "high" groups respectively. These 100 municipalities are depicted on the map in Figure 3.

Regression analysis (not shown) suggests that the association between the number of IDPs and the SI scores on the municipality level is also weak and not statistically significant, meaning that locations with more IDPs are by no means less safe than locations with fewer IDPs.[5] For a comprehensive list of the 100 municipalities with their corresponding SI scores please refer to *Appendix C - Stability Index Table.*

[4] Standard deviation (SD) is a measure of distance from the mean. In a normal (or Gaussian) distribution, about 68% of data points lie within 1 SD from the mean, so values outside of this range can be said to be "low" or "high" in comparison to the overall average.
[5] Regressing the number of returnees on the SI produces a similar result. The two variables are not correlated in a statistically significant way, indicating the lack of the relationship. These results are in line with the results obtained on *mantika* level.

Fig 3 Stability Group of Municipalities (*Baladiyas*)



All maps are for illustration purposes only. Names and boundaries on this map do not imply endorsement or acceptance by IOM.

NOTE: The size of the points on the map corresponds to the number of IDPs in that municipality. Thus, the larger bubbles have a higher proportion of IDPs identified in those locations.

LOW STABILITY GROUP

14 OUT OF 100 MUNICIPALITIES (***BALADIYAS***) ARE IN THIS GROUP

MEDIUM STABILITY GROUP

73 OUT OF 100 MUNICIPALITIES (***BALADIYAS***) ARE IN THIS GROUP

HIGH STABILITY GROUP

13 OUT OF 100 MUNICIPALITIES (***BALADIYAS***) ARE IN THIS GROUP

SI SCORES FOR MUNICIPALITIES BY KEY THEME

Municipalities in Libya, on average, score high for Livelihoods and Access to Services (mean=77.8) and Social Cohesion (mean=83.7) theme components. With regard to the Disaster Risk Reduction Measures component the average score across all municipalities is much lower (mean=47.4). Notably, only 11 and six per cent of municipalities score below 25 for Livelihoods and Social Cohesion, respectively, while one third of municipalities scores below 25 for the questions relating to Disaster Risk Reduction Measures. A full breakdown of SI scores by key theme follows in the next section.

Table 3 Number (and percentage) of Municipalities (*Baladiyat*) Below and Above National Average SI by Component

Region	Stability Index	Livelihood Component	Social Cohesion Component	Disaster Risk Reduction Measures Component
Above average	50	75	67	65
Below average	50	25	33	35

Fig 4 Stability Index (ranked) and Theme Components for Municipalities (*Baladiyat*)

Municipality (baladiya)	Stability Index	Livelihoods Component	Social Cohesion Component	Disaster Risk Reduction Measures Component
Al Ajaylat	100.0	100.0	100.0	100.0
Al Aziziya	100.0	100.0	100.0	100.0
Arrhaibat	100.0	100.0	100.0	100.0
Azzahra	100.0	100.0	100.0	100.0
Ejkherra	100.0	100.0	100.0	100.0
Gemienis	100.0	100.0	100.0	100.0
Ghadamis	100.0	100.0	100.0	100.0
Jadu	100.0	100.0	100.0	100.0
Alqubba	99.1	97.2	100.0	100.0
Daraj	99.1	97.2	100.0	100.0
Garabolli	99.1	97.2	100.0	100.0
Tazirbu	99.1	97.2	100.0	100.0
Kikkla	92.4	77.2	100.0	100.0
Abusliem	85.7	86.1	100.0	71.0
Alasabaa	85.0	100.0	100.0	55.0
Albayda	85.0	100.0	100.0	55.0
Alharaba	85.0	100.0	100.0	55.0
Arrajban	85.0	100.0	100.0	55.0
Arrayayna	85.0	100.0	100.0	55.0
Suloug	85.0	100.0	100.0	55.0
Espeaa	84.1	97.2	100.0	55.0
Sidi Assayeh	84.1	97.2	100.0	55.0
Tobruk	84.1	97.2	100.0	55.0
Toukra	84.1	97.2	100.0	55.0
Ghiryan	82.9	87.8	60.9	100.0
Suq Aljumaa	82.7	77.2	100.0	71.0
Jalu	82.6	97.2	100.0	50.7
Tripoli	81.8	90.4	100.0	55.0
Azzawya	81.4	89.2	100.0	55.0
Aujala	81.3	88.9	100.0	55.0
Jardas Alabeed	81.3	88.9	100.0	55.0
Tajoura	80.9	85.7	100.0	57.1
Aljmail	80.4	82.4	100.0	58.8
Nesma	80.2	85.7	100.0	55.0
Gharb Azzawya	79.7	84.1	100.0	55.0
Misrata	78.7	88.2	85.4	62.5
Hai Alandalus	78.3	80.0	100.0	55.0
Qasr Bin Ghasheer	78.3	80.0	100.0	55.0
Suq Alkhamees	78.3	80.0	100.0	55.0
Surman	78.3	80.0	100.0	55.0
Swani Bin Adam	78.3	80.0	100.0	55.0
Alkhums	74.7	77.2	100.0	47.0
Derna	74.7	77.2	100.0	47.0

Fig 4 Stability Index (ranked) and Theme Components for Municipalities (*Baladiyat*) [Continued]

Municipality (baladiya)				
Ain Zara	74.6	80.0	43.8	100.0
Janzour	74.1	80.4	53.9	88.0
Murzuq	71.7	86.1	58.2	71.0
Ghat	71.1	100.0	58.2	55.0
Emsaed	71.0	97.2	60.9	55.0
Taraghin	70.2	10.7	100.0	100.0
Albawanees	70.1	97.2	58.2	55.0
Alkufra	67.3	100.0	100.0	2.0
Hrawa	67.3	100.0	100.0	2.0
Kabaw	67.3	100.0	100.0	2.0
Ubari	67.3	100.0	100.0	2.0
Zliten	66.6	81.5	63.4	55.0
Baten Aljabal	66.4	97.2	100.0	2.0
Alabyar	65.3	40.8	100.0	55.0
Msallata	64.1	89.5	100.0	2.9
Almarj	64.0	37.1	100.0	55.0
Labriq	63.9	89.2	100.0	2.5
Albrayga	63.6	88.9	100.0	2.0
Khaleej Assidra	63.6	88.9	100.0	2.0
Qasr Akhyar	63.1	85.2	43.8	60.4
Algurdha Ashshati	62.7	14.5	73.6	100.0
Wadi Etba	62.7	86.1	100.0	2.0
Nalut	62.4	81.7	100.0	5.6
Umm Arrazam	61.6	86.1	43.8	55.0
Aljufra	61.5	95.2	77.8	11.5
Rigdaleen	61.1	28.3	100.0	55.0
Alhawamid	60.7	80.0	100.0	2.0
Alsharguiya	60.7	14.3	89.3	78.6
Marada	60.7	80.0	100.0	2.0
Ziltun	59.7	77.2	100.0	2.0
Zwara	59.7	77.2	100.0	2.0
Bir Alashhab	59.6	80.0	43.8	55.0
Shahhat	58.7	69.8	100.0	6.1
Yefren	58.0	83.3	87.4	3.2
Abu Qurayn	56.2	85.7	10.2	72.7
Alqayqab	55.8	12.4	100.0	55.0
Bint Bayya	55.4	88.9	73.6	3.9
Thaher Aljabal	54.8	9.4	100.0	55.0
Ejdabia	54.2	93.0	67.5	2.0
Sabratha	53.8	80.1	66.1	15.1
Azzintan	53.2	82.8	72.2	4.7
Assahel	52.2	89.1	64.6	2.9
Tarhuna	51.6	24.0	75.7	55.0
Algatroun	49.3	87.8	58.2	2.0
Janoub Azzawya	48.1	12.4	60.9	71.0
Wazin	47.7	97.2	43.8	2.0
Al Maya	47.3	33.0	100.0	8.8
Sirt	43.1	17.0	57.2	55.0
Sebha	41.1	37.2	82.4	3.9
Bani Waleed	40.3	47.6	70.0	3.3
Edri	37.7	22.8	7.4	83.0
Benghazi	35.1	87.1	14.1	4.0
Ashshgega	30.9	81.6	5.5	5.5
Alghrayfa	30.6	16.0	70.0	5.6
Brak	29.9	83.8	2.0	3.9
Ashshwayrif	27.9	26.6	2.0	55.0
Al Qalaa	27.2	16.8	60.9	3.8

05. CHARACTERISTICS OF COMMUNITIES BY KEY THEME RELATED TO STABILITY

This section gives an overview of the key characteristics of communities that are related to the Stability Index according to the three themes: livelihoods and access to services, social cohesion and disaster risk reduction measures. In doing so, it relies on three main techniques: cross-tabulation, data visualization and K-means clustering.

LIVELIHOOD AND ACCESS TO BASIC SERVICES

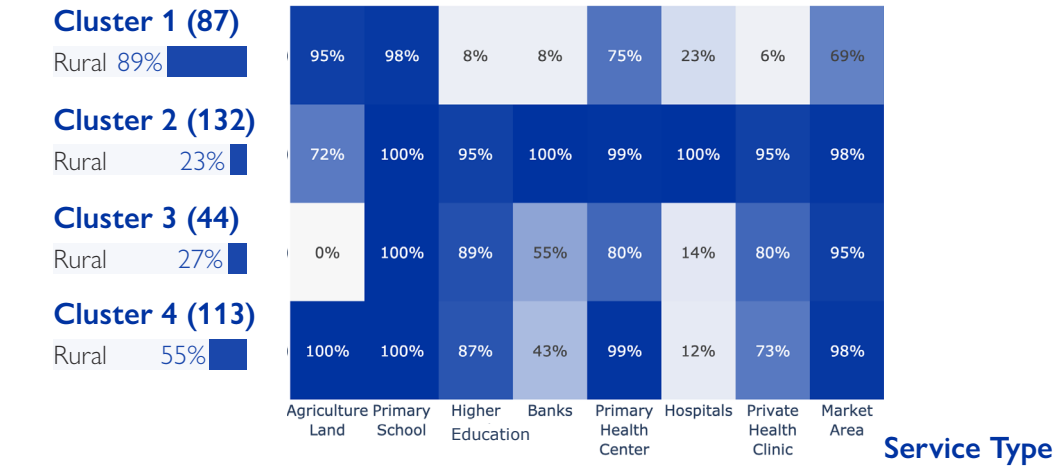
Questions in this theme covered a range of topics, such as availability of facilities, businesses, employment opportunities, access to food and basic utilities as well as access to information, communication technology (ICT). To better understand the distribution of facilities across communities, K-means clustering was performed to group communities using seven service types. For each community, every service type is represented by a binary variable with the value of 1 if that service type is available in that community and the value of 0 otherwise. Running K-means with 4 clusters produces four distinct groups of communities. Each cluster can be described by its centre.[6] As all variables used for clustering are binary, the centres represent the proportion of communities in the cluster where those services are available. These cluster centres are depicted in Figure 5.

What is K-means clustering?

K-means clustering is an unsupervised machine learning algorithm used to group data points in k clusters. The "unsupervised" part means that the algorithm does not require any labelled examples to guide it. It suffices to provide the algorithm with features (variables) that it will use to figure out how to allocate data points to clusters. The value of k needs to be set by the user before running the algorithm.

The main goal of K-means is to create clusters in such a way that data points within each cluster are closer to that cluster's centre than to the centre of any other cluster. Cluster centres, known as "centroids", can be used to succinctly describe cluster members. For example, in the case when data points are described by only binary features (Yes/No, True/False, 1/0), cluster centres naturally represent the proportion of data points in each cluster that take a positive value (Yes/True/1) for each respective variable. The main use case for K-means clustering is to uncover structure and find patterns in the data, i.e., discover commonalities and differences among data points.

Fig 5 Proportion of Communities in the Cluster where Services/Facilities are available, by K-means Clusters (k=4)

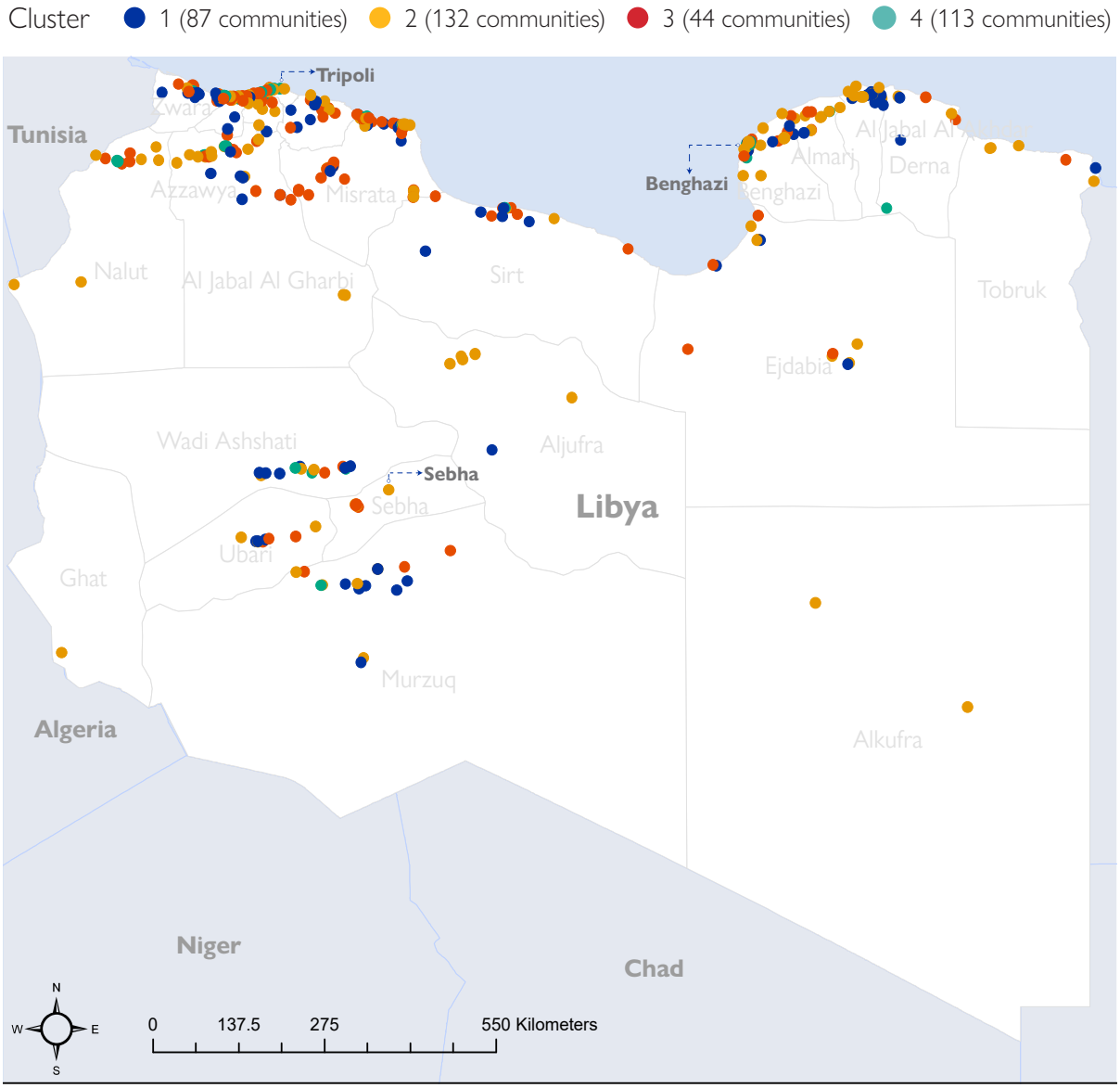


Public Services and Facilities Distribution across Communities in Libya

As depicted in Figure 5, the first cluster encompasses 87 communities, primarily rural (89%)[7]. Notably, this cluster lacks various essential facilities, with minimal access to higher-level educational institutions (8%), banks (8%), and private health clinics (6%). Additionally, the availability of primary health centers (75%) and market areas (69%) is significantly lower compared to other clusters. Moving to the second cluster, which includes 132 communities, predominantly urban (77%), there is a markedly higher overall availability of facilities, excluding agricultural land (72%). The third cluster, comprising 44 communities, exhibits a a mostly urban composition (73% urban). While it boasts high availability of higher-level educational institutions (89%), primary health centers (80%), and private health clinics (80%), it lacks agricultural land and has limited access to hospitals (14%) and banks (55%). Lastly, the fourth cluster, with 113 communities, is mostly rural (55%) and closely resembles the third cluster. However, it distinguishes itself by having access to agricultural land and notably higher availability of primary health clinics (99%), coupled with lower access to banks (43%) and private health clinics (73%). In summary, the first cluster represents the most deprived areas in terms of essential facilities.

[6] Note that cluster IDs, i.e., 1, 2, 3, 4, do not have any intrinsic meaning. These are used only for the ease of reference.
[7] Clustering was performed using only the availability of facilities as variables. The share of rural areas in each cluster is included for information purposes only and the urban/rural variable was not used as input to K-means.

Fig 6 Map of Surveyed Communities by Cluster



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Implications for Understanding Access to Services in Each Cluster

- Healthcare Disparities: Across all clusters, there are variations in healthcare access. Some clusters lack private health clinics, while others have limited access to hospitals. This emphasizes the need for targeted healthcare programs to address healthcare disparities based on the specific needs of each cluster.

- Educational Infrastructure Gaps: The first and third clusters have limited access to higher-level educational institutions. Focusing on improving educational infrastructure will provide residents with better educational opportunities.

- Rural Similarities with Distinctions: The fourth cluster, mostly rural like the first, distinguishes itself by having access to agricultural land and higher availability of primary health clinics. While there are similarities, the differences highlight the importance of tailoring interventions to the specific needs of each rural cluster rather than adopting a one-size-fits-all approach.

Variability in Access: ICT Disparities, Economic Impact, and Utility Accessibility

Urban and rural areas experience a significant digital divide in terms of Information and Communication Technology (ICT) access. While 83.4 per cent of urban communities have full mobile network coverage, only 68.3 per cent of rural areas enjoy the same. In urban locations, 62.7 per cent reported improved mobile network or Wi-Fi connections in the past year, but in rural areas, 37.4 per cent noted no change, and 12.3 per cent reported deterioration. This discrepancy can hinder rural communities' ability to respond to emergencies and limits their integration into broader discussions at national, regional, or municipal levels. Establishing equitable ICT infrastructure is crucial for implementing early warning systems and fostering social cohesion nationwide.

Table 4 Mobile Connection Changes and Shelter Resilience to Natural Hazards in Communities in Libya

Q8.3: Changes to Mobile/WiFi Connection (Past Year) / Q7.6: Resilience of Shelters to Natural Hazards (Past 2 Years)	1 – Resilient	2 – Not resilient
1 – Hasn't Changed or Deteriorated	14	147
2 –Connection Improved	63	152

In economic terms, the availability of businesses is integral to boosting job opportunities in a community. When compared to residents in communities where only some small businesses are open, residents in communities where most or all small businesses are open are 1.7 times ($p < 0.05$[8]) more likely to all find employment, as shown in Table 5. Similarly, residents in communities where most or all large businesses operate are 2.5 times ($p < 0.01$) more likely to all find employment as opposed to communities with only some large businesses operating (not shown).

Table 5 Employment and Operational Status of Small Businesses in Communities in Libya

Q5.4 Employment Opportunities and Q5 Operational Status of Small Businesses	1 – Most or all residents can find employment	2 – Around half the residents can find employment	3- Less than half the residents can find employment	4- None of the people can find employment
1– Most or all businesses are open	161 (49.4%)	95 (29.1%)	61 (18.7%)	9 (2.8%)
2 – Some businesses are open	8 (29.6%)	8 (29.6%)	4 (14.8%)	7 (25.9%)
3 – None of the businesses are open	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
4 – Not applicable, there is no business in location	4 (40.0%)	1 (10.0%)	4 (40.0%)	1 (10.0%)

In 70.9 per cent of communities, most residents have sufficient electricity and water, yet 5.7 per cent lack one or both utilities (Table 6). Communities with most or about half of residents having both utilities (mean SI = 73.1) exhibit higher stability scores than those with less than half or no residents with both utilities (mean SI = 62).

Table 6 Availability of Electricity and Water in Communities in Libya

5.11 Electricity / 5.13 Water	1– Most or all have enough water	2 – About half the residents have enough water	3- Less than half the residents have enough water	4- None of the residents have enough water	All
1 – Most or all have enough electricity	249 (70.9%)	40 (11.4%)	12 (3.4%)	14 (4.0%)	315 (89.7%)
2 – About half the residents have enough electricity	22 (6.3%)	3 (0.9%)	0 (0.0%)	0 (0.0%)	25 (7.1%)
3- Less than half the residents have enough electricity	4 (1.1%)	1 (0.3%)	0 (0.0%)	1 (0.3%)	6 (1.7%)
4- None of the residents have enough electricity	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (1.4%)	5 (1.4%)
All	275 (78.3%)	44 (12.5%)	12 (3.4%)	20 (5.7%)	351 (100.0%)

[8] P-value below 0.05 here and henceforth indicates that the result of a statistical test is significant, meaning the observed phenomenon is unlikely to be an artifact of the data sample and likely to be a real-life phenomenon.

SOCIAL COHESION

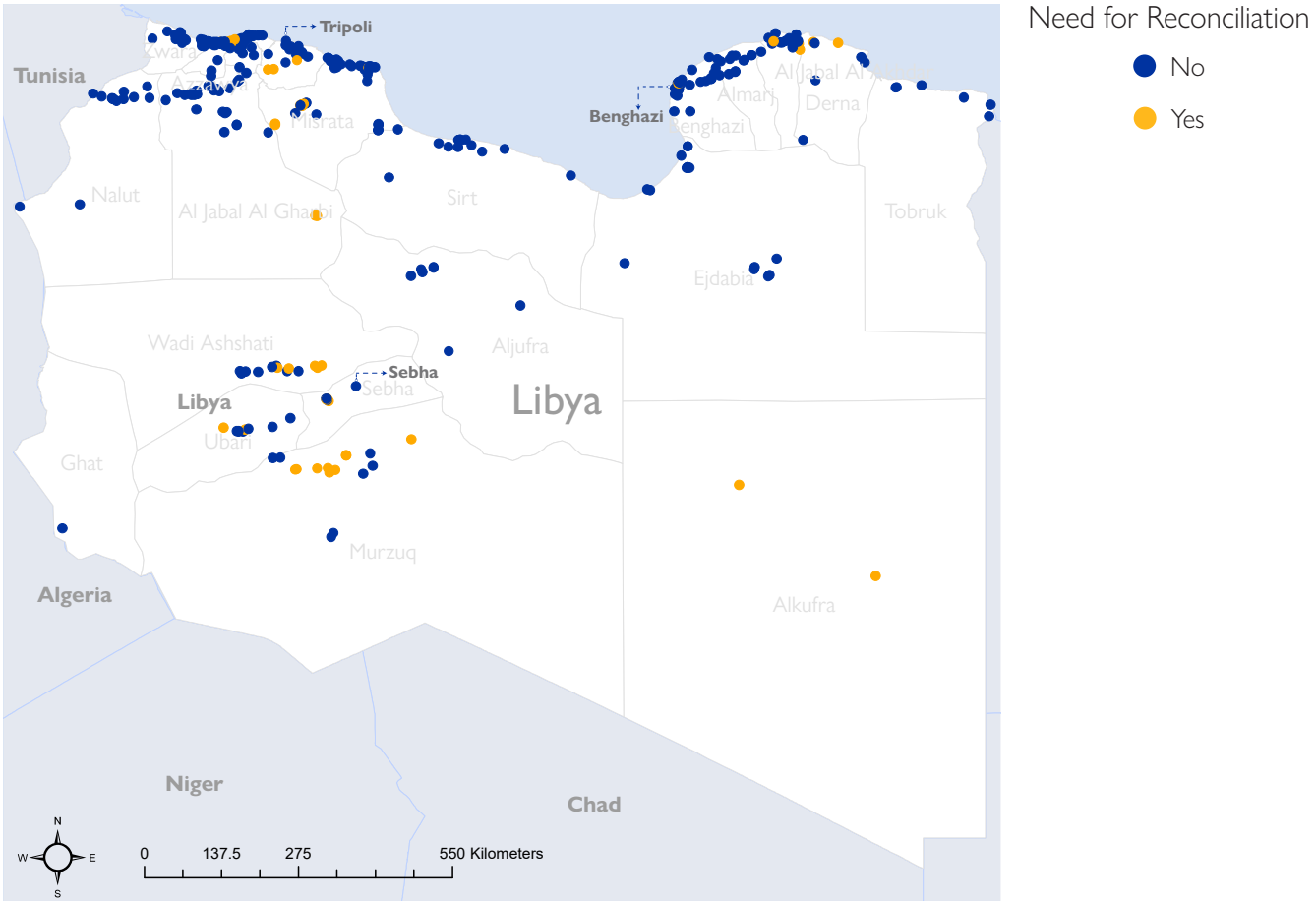
Social cohesion centered on understanding the roles of civil servant presence and civil society organizations, as well as delving into concerns associated with explosive devices, violence, and communal tensions. Physical security emerged as a notable concern in a subset of the assessed areas, with 8.8 per cent expressing worry about explosive devices and 18.6 per cent about violence stemming from or occurring between security forces or armed groups. Notably, Table 7 reveals a regional nuance, highlighting that communities in East Libya exhibit the highest level of apprehension regarding explosive devices while simultaneously registering the lowest levels of concern regarding armed violence.

Table 7 Proportion of Communities Concerned about Explosive Devices and Armed Violence by Geodivision

Geodivision	Very or somewhat concerned about explosive devices	Very or somewhat concerned about violence from or between security forces or armed groups
East	10.9%	6.9%
South	9.3%	25.9%
West	7.7%	22.2%

Simultaneously, 13.1 percent of assessed areas highlighted the need for reconciliation with different communities, either within their locale or nearby, to ensure peaceful coexistence and prevent escalating violence (Figure 7). Among communities expressing this need, around 37.5 per cent are notably concerned about local communal tensions, while 20.8 per cent face challenges accessing formal or informal conflict resolution forums. Civil society organizations are actively present in 77.4 percent of surveyed communities, with a stronger presence in the East (86%) and South (81.1%) geodivisions.

Fig 7 Map of Communities by the Need for Reconciliation as Reported by Key Informants



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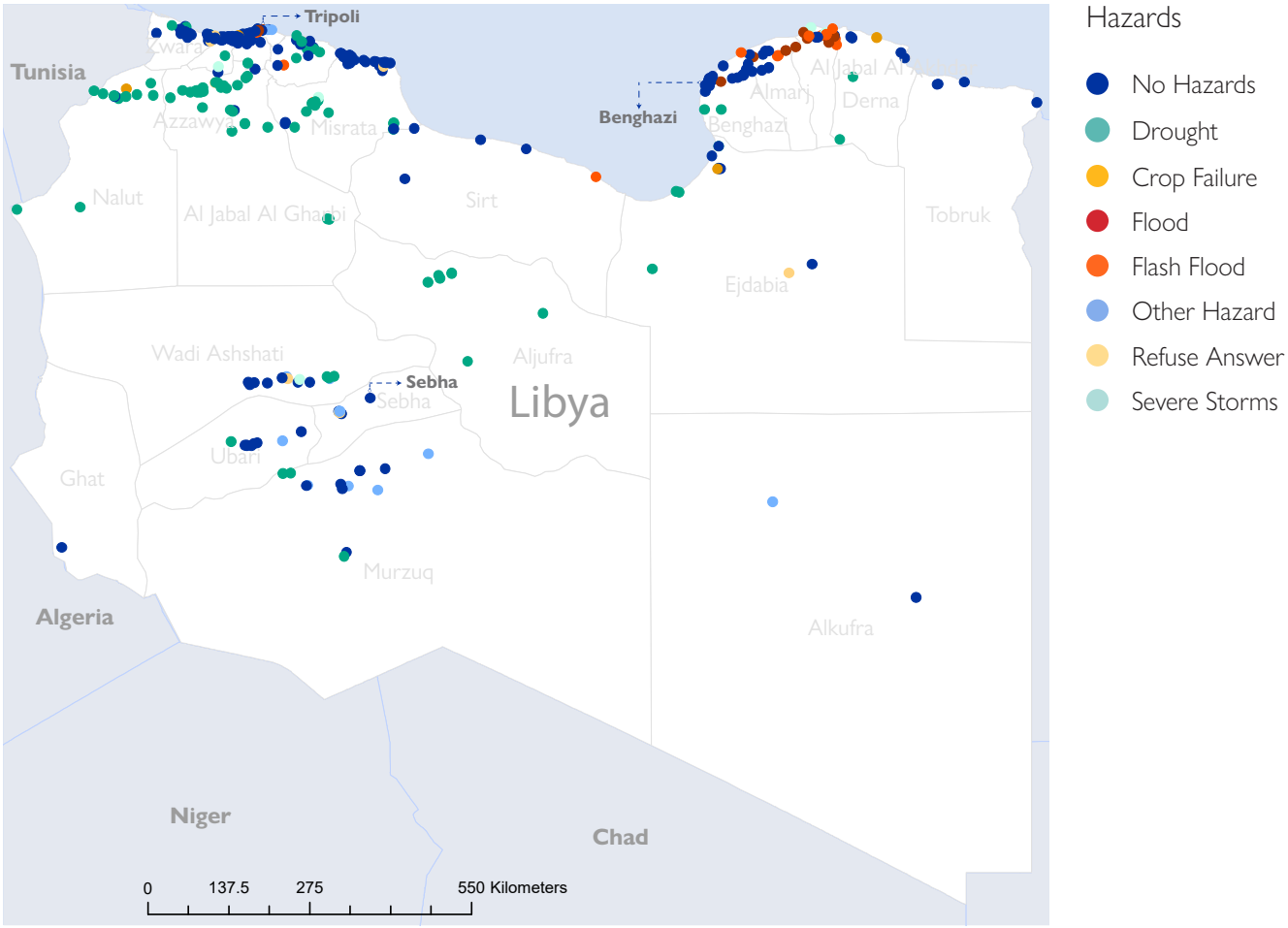
DISASTER RISK REDUCTION MEASURES

Environmental Conditions and Hazards Affecting Communities

Key informants were also asked about hazards affecting their communities and the impact on the lives of residents in this area. More than two in five (43.1%) key informants reported a hazard that affected their community in the last two years, with drought being by far the most common type (reported in 24.9% of communities assessed). Flash floods or floods were reported in 8.5 per cent of communities. Drought has affected communities across the country, especially in the North-Western part, while floods impacted communities mostly in the North-Eastern part, as can be seen in Figure 8.

Fig 8 Map of Communities by Most Frequent Hazard Type in the Last Two Years



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Impact of Storm Daniel

It should be noted that during the period of data collection Storm Daniel made landfall on 10 September 2023. As of October 2023, **new displacements due to the flooding** were identified by DTM Libya, mostly in the northeastern regions (*mantikas*) of Derna, Al Jabal Al Akhdar and Benghazi. As the most recent hazard event to trigger a large number of displacements (especially in the northeastern regions), the availability of disaster risk reduction measures are pertinent for assessing the stability of municipalities.

Longer Term Climatic Trends and Impacts

To gain deeper insights into longer-term climate trends, the survey sought the perspectives of key informants regarding changes in weather patterns spanning the past three decades. A notable 53.5 per cent of key informants highlighted discernible temperature increases, while 49.7 per cent reported shifts in rainfall patterns over the last 10-30 years. Notably, one in four communities experienced the combined impact of rising temperatures and changes in rainfall patterns. Other common changes included shifts in seasons (24.7%), irregular rainfall (22.1%) and loss or degradation of agricultural land (13.0%). Only 12.1 per cent of communities asserted no discernible shifts in weather patterns over the last three decades.

For communities grappling with evolving weather conditions, the ramifications have been multifaceted. The impact has ranged from hampered agricultural production (62.2%) as the main consequence, followed by losses in income (33%) and property or asset losses (30.3%).Other substantial challenges included the scarcity of safe drinking water (27.3%), loss of livestock (14.2%), and health hazards (11.6%). Despite the incidence of hazards, only 22.4 per cent of communities have taken measures to adapt. This discrepancy is particularly evident in communities grappling with flash floods or floods as their primary hazards; out of the 29 communities affected, only key informants from two communities reported the implementation of mitigation measures. This indicates a critical gap in adaptive strategies within these vulnerable communities, necessitating attention.

Table 8 Number of Communities by Most Frequent Hazard and Measures to Adapt

Q7.1 Highest frequency hazard in this community in the last 2 years	Q7.5. Are residents taking measures to adapt to hazards or weather change as described before?	
	No	Yes
Crop failure	2	2
Drought	63	22
Flash flood	14	1
Flood	13	1
No hazards in the last 12 months	142	36
Other hazard	6	7
Severe storms	7	1

Drought: Coping Strategies and Barriers to Adaptation Measures

Communities grappling with the impacts of drought employ a range of strategies to cope with the challenges. The most prevalent response involves the adoption of irrigation practices, with 45.5 per cent of affected communities opting for this water-conservation measure. Additionally, 18.2 per cent of communities prioritize resilience by utilizing stronger building materials, while 13.6 per cent focus on reinforcing their roofs to withstand the harsh conditions. A further 9.1 per cent of communities explore economic diversification as a means to mitigate the adverse effects of drought.

According to the key informant interviews, there is a subset of communities affected by drought has not implemented any specific measures. The reasons behind this inaction vary. A significant portion, constituting 44.4 per cent, expressed a lack of knowledge about appropriate actions, highlighting an educational gap. Another segment, comprising 25.4 per cent, perceives the issue as too large for them to address independently, underscoring the need for collaborative solutions and external support.

Financial constraints emerge as a significant barrier to adaptation, with 17.5 per cent of communities acknowledging insufficient funds to implement necessary measures. A smaller percentage, representing 4.8 per cent, cites a lack of skills as a hindrance to taking effective action. In a minority of cases, 7.9 per cent of communities do not perceive the implementation of measures as necessary, emphasizing the importance of awareness campaigns to convey the urgency of addressing drought-related challenges. Overall, these insights underscore the multifaceted nature of community responses to drought.

Resilience of Infrastructure and Land Exposure to Hazards

Regarding resilience, only one out of five key informants reported that their community's infrastructure demonstrates resilience to hazards, highlighting a concerning gap in preparedness. Less than three per cent of communities have implemented an early warning system, a critical tool for proactive hazard management. Furthermore, community engagement in hazard mitigation activities is limited, with only a quarter of communities showing any degree of participation.

Key informants also provided valuable insights into the extent of land exposure to hazards. Figure 11 illustrates the communities categorized by the proportion of land affected by various hazards. In over one-third of communities, a significant portion— at least half of the land—is exposed to different types of hazards. This emphasizes the need for enhanced resilience measures, including improved infrastructure, widespread adoption of early warning systems, and increased community participation in hazard mitigation activities. Addressing these gaps is crucial for building robust resilience and minimizing the impact of hazards on vulnerable communities, In absolute terms, the number of communities reporting over 75 per cent of land exposed to hazards is the highest in Benghazi municipality (Benghazi region) (10 communities) and Bani Waleed municipality, located in Misrata region (15 communities).

Fig 9 Map Of Communities By The Proportion Of Land Exposed To Hazards

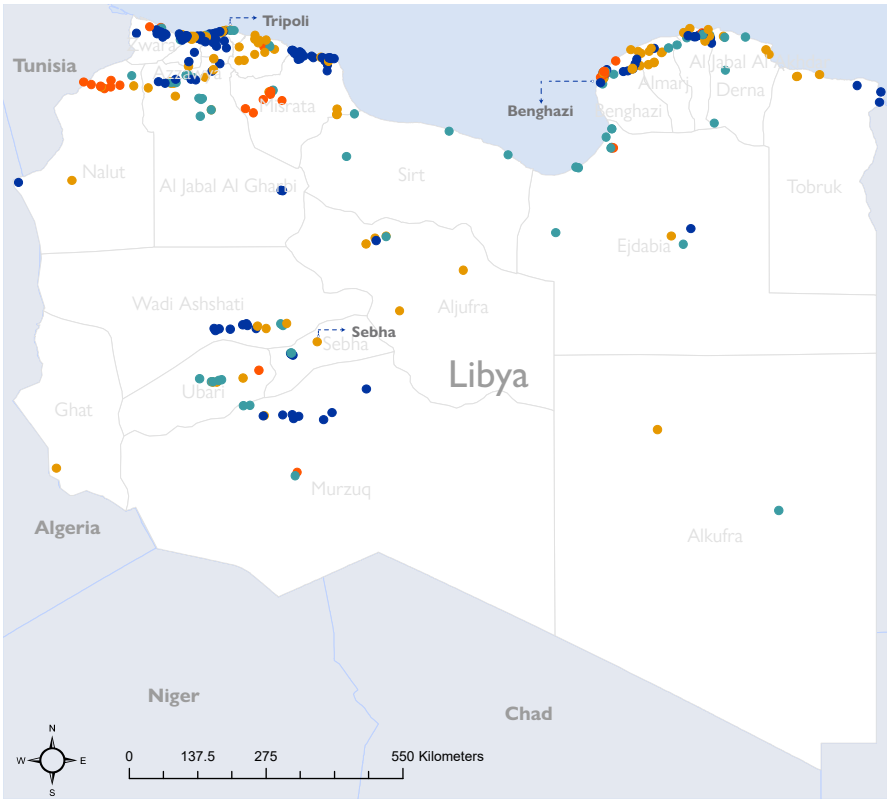
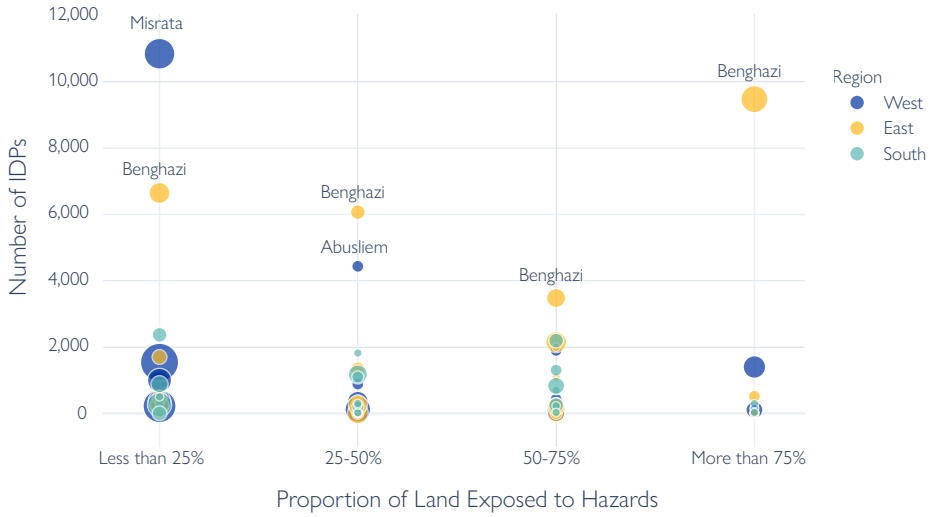


Table 9 Top 5 Municipalities With Communities Reporting Over 75% Of Land Exposed To Hazards

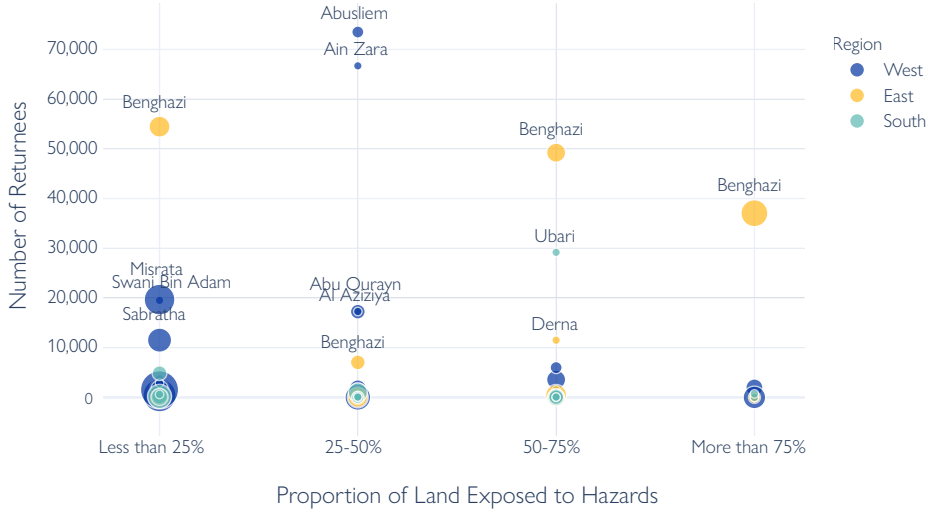
Region (*Mantika*)	Municipality (*Baladiya*)	Number of Communities (*Muhallas*)	Percentage of communities in each municipality reporting over 75% of land exposed to hazards	Number of communities reporting over 75% of land exposed to hazards
Benghazi	Benghazi	25	40%	10
Misrata	Bani Waleed	15	46.7%	7
Nalut	Nalut	6	66.7%	4
Ejdabia	Ejdabia	8	25%	2
Nalut	Kabaw	1	100%	1

Fig 10 Number Of IDPs In Municipalities By The Proportion Of Land Exposed To Hazards



NOTE: The size of the bubbles corresponds to the number of communities in each municipality

Fig 11 Number Of Returnees In Municipalities By The Proportion Of Land Exposed To Hazards



NOTE: The size of the bubbles corresponds to the number of communities in each municipality

According to the data presented in Table 9, Benghazi municipality stands out with the highest number of communities (10) reporting that over 75 percent of their land is exposed to hazards. In these areas, nearly 10,000 IDPs are currently residing, alongside almost 40,000 returnees. On the other hand, even in municipalities with slightly lower percentages of land exposed to hazards (25-50%; less than 25%), there is a significant presence of IDPs. For instance, as seen in Figures 10 and 11 above, communities in Benghazi, Misrata, and Abusliem municipalities reporting lower levels of hazard exposure, exhibit a higher concentration of IDPs and returnees compared to communities where over 75 percent of the land faces hazards.

This has programmatic implications for prioritizing programs in communities with both high hazard exposure and substantial populations of IDPs and returnees. Additionally, recognizing the notable presence of displaced and returnee populations in municipalities like Misrata and Abusliem with lower hazard exposure underscores the need for comprehensive support in these locations as well. This approach ensures that humanitarian efforts address the dual challenge of environmental hazards and the vulnerable displaced and/or returning populations.

METHODOLOGY: CALCULATING THE STABILITY INDEX IN LIBYA

As the data collected represents community-level information, the Stability Index is first calculated for communities (*muhallas*) and then aggregated to municipality (*baladiya*) and region (*mantika*) levels. The construction of the index is done in three stages.

In the first stage, a statistical model is used to identify factors that are associated with the stability of the surveyed communities. As the outcome (dependent) variable of interest is binary (stable/unstable), logistic regression is used to model the relationship between that variable and a set of 40 explanatory variables which capture the information about livelihoods, basic services, social cohesion and disaster risk reduction measures. A full list of the variables used in the model is listed in *Appendix B. Survey Questions by Theme.* To proxy the *actual* stability of communities, three questions about the perceived stability from the survey are used. Thus, a community is said to be stable if a key informant reported baseline (stable) conditions for all three questions and it is said to be unstable if a non-optimal (unstable) condition was reported for at least one question. These three questions together with their stable and unstable conditions are shown in Table 10. The distribution of responses for these questions is shown in Figure 12. According to this methodology, 79 out of 376 communities (21%) in Libya are considered unstable, as depicted in Figure 13.

Table 10 Interview Questions on Perceptions of Stability

Interview Question	Baseline (Stable) Condition	Non-optimal (Unstable) Condition
Q1.1 Which of the following statements best describes the general perception of stability in the neighbourhood?	A – The general perception is that the neighborhood is stable and safe.	B – The general perception is that the neighborhood is unstable and dangerous.
Q1.2 Which of the following statements best describes how the residents of the community perceive their ability to stay in the neighborhood for the next 3 months?	A – Neighborhood residents perceive that they can stay 3 months and don't need to leave quickly.	B – Neighborhood residents perceive that they cannot stay 3 months and may need to leave quickly.
Q1.3 How has the general perception of the situation in this community changed over the past 3 months?	A – The general perception is more optimistic about the situation in this community than 3 months ago.	B – The general perception is less optimistic about the situation in this community than 3 months ago.

Fig 12 Distribution Of Responses By Key Informants On Perceptions Of Stability In Their Community

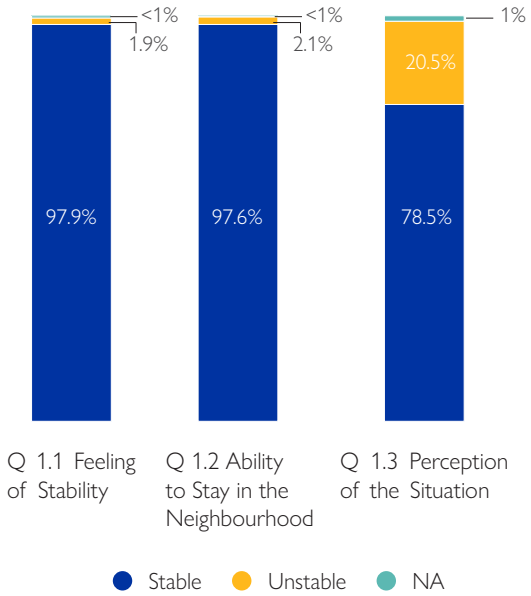
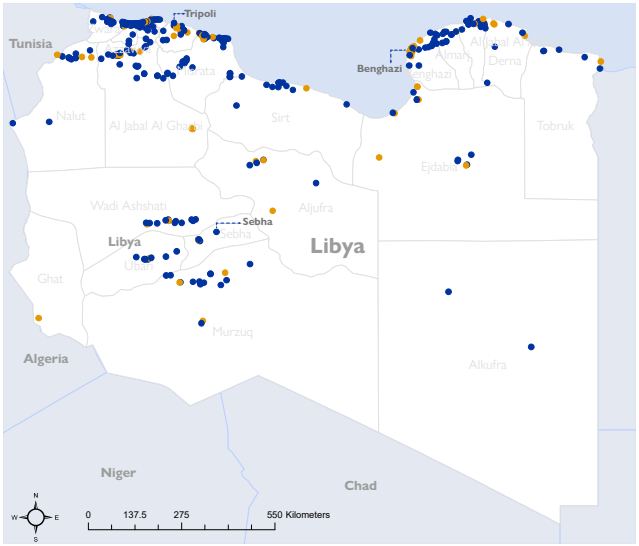


Fig 13 Perceptions Of Stability By Community, As Reported By Key Informants



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In the second stage, the explanatory variables that are found statistically significant[1] (at a level of 10%) in the first stage are assigned a score that is proportional to the degree of statistical association they have with the outcome variable (stability). The variable scores are derived from model coefficients reweighted within each theme (as per Table 11) such that the scores for the variables within each theme sum up to 100. Each community is then scored against all three themes on 100-point scale, with higher scores indicating more stable communities. Lastly, the Stability Index for communities is computed as the average score across the three themes. Out of 40 variables used in the first stage, only nine are statistically significant. These are reported in Table 11 below, together with baseline and non-optimal conditions, model coefficients and derived scores organised by theme. In the third and final stage, the Stability Index for municipalities is computed by aggregating the indices of their respective communities. However, instead of using a simple arithmetic mean, the harmonic mean is used to penalise the index for municipalities that have less stable communities.[2]

ASSUMPTIONS AND LIMITATIONS

Two key assumptions underlie the analysis: 1) key informants accurately represent community stability, and 2) surveyed communities reflect others in the municipality, allowing findings to be generalized. These assumptions cannot be verified from the data alone, emphasizing the importance of ensuring respondent representativeness during survey design. It should be noted that the logistic regression model indicates the degree of association, not causal relationships, between stability and explanatory variables.

Table 11 Statistically Significant Variables in the Logistic Regression to Predict Stability in Muhallas

Variable	Theme	Baseline Condition (X=1)	Non-Optimal Condition (X=0)	Coefficient	Odds Ratio	Score
Q4.9 Hospital(s)	Livelihoods And Basic Services	Hospital(s) Available	Hospital(s) Not Available	0.84	2.32	21.0
Q4.11 Market Or Shopping Area	Livelihoods And Basic Services	Market Or Shopping Area Available	Market Or Shopping Area Not Available	2.07	7.91	71.6
Q5 Small Businesses	Livelihoods And Basic Services	Most Or All Businesses Are Open	Some Or No Businesses Are Open	-1.26	0.28	2.6
Q5.11 Electricity	Livelihoods And Basic Services	About Halt, Most Or All Have Enough Electricity	Less Than Half Or None Of The Residents Have Enough Electricity	-2.20	0.11	1.0
Q8.3 Mobile And Wi-Fi Connection	Livelihoods And Basic Services	The Connection Has Improved	The Connection Has Not Changed Or Deteriorated	-0.87	0.42	3.8
Q5.10 Civil Servants	Social Cohesion	Most Or All Civil Servants Are Back In The Location And Have Restarted Their Work	Some Or None Civil Servants Are Back In The Location And Have Restarted Their Work	-1.22	0.29	42.8
Q6.13 Civil Society Organizations	Social Cohesion	Most Or All Civil Servants Are Back In The Location And Have Restarted Their Work	Some Or None Civil Servants Are Back In The Location And Have Restarted Their Work	-0.93	0.39	57.2
Q7.5 Adaptation To Hazards	Disaster Risk Reduction Measures	Yes, Residents Are Taking Measures To Adapt	No, Residents Are Not Taking Measures To Adapt	-0.99	0.37	46.0
Q7.8 Land Affected By Hazards	Disaster Risk Reduction Measures	Less Than 50% Of Land Can Be Affected By Hazard	More Than 50% Of Land Can Be Affected By Hazard	-0.82	0.44	54.0

[1] Statistical significance at 10% level implies that the established relationship between an independent variable and the dependent variable (in this case, stability) is likely to be observed in the actual population of interest in 90% of cases. Thus, for non-significant variables, there is a more than 10% chance that their true relationship with the dependent variable is either non-existent (the variables are independent) or, in fact, the opposite of what the model suggests. Non-significant variables are therefore ignored for index calculation.

[2] To illustrate, both arithmetic and harmonic means between 50 and 50 is 50. However, while the arithmetic mean between 20 and 80 is still 50, the harmonic mean of these two numbers is 32. Using the harmonic mean makes it possible to distinguish between municipalities where all communities have similar SI scores from those where some communities have scores that are much lower than the scores of others.

APPENDIX A - SURVEY QUESTIONS BY KEY THEME

Key Theme	Question *Note: Only core questions are shown. Additional questions included free text responses (e.g., "If other, please specify"), follow-ups and administrative questions such as the type of a community, location details etc.*	Used in the Model ***Note: Some variables were not used in the model due to a large number of missing values, high degree of correlation with variables already included or low degree of variability.***
Stability	1.1. Which of the following statements best describes the general perception of stability in the neighbourhood?	Yes, combined into a binary outcome variable
Stability	1.2. Which of the following statements best describes how the residents of the community perceive their ability to stay in the neighborhood for the next 3 months?	
Stability	1.3. How has the general perception of the situation in this community changed over the past 3 months?	
Livelihoods and basic services	4. Please select if this location/Muhalla has at least one of any of the following facilities or public services within its local boundaries: Agriculture land, cattle stock, primary school, higher levels of school, university of colleges, banks, other financial service provides, primary health center, hospital(s), private health clinic(s), marker or shopping areas.	Yes
Livelihoods and basic services	5. Are the small businesses (private sector) in this location currently operating? This category includes small companies, such as shops or bakeries	Yes
Livelihoods and basic services	5.2 Are large companies (public and private sector) in this location currently operating? This category includes large businesses, such as factories	Yes
Livelihoods and basic services	5.4 Can residents in this location find employment?	Yes
Livelihoods and basic services	5.5 How easy is it for residents to access and obtain food items in nearby markets?	Yes
Livelihoods and basic services	5.6 How easy is it for residents to access and obtain basic items (non-food items) for their daily subsistence in nearby markets?	Yes
Livelihoods and basic services	5.11 Do residents have enough electricity for their needs?	Yes
Livelihoods and basic services	5.13 Do residents have enough water for their drinking and domestic needs?	Yes
Livelihoods and basic services	5.14 Are the houses in the location destroyed/ heavily damaged?	No
Livelihoods and basic services	5.19 How possible is for residents from this location to access a hospital nearby?	Yes

Livelihoods and basic services	8.1 Is the area covered by a mobile operator?	Yes
Livelihoods and basic services	8.3 Which of the following best describes the changes to mobile or WIFI connection over the past year on the area?	Yes
Social cohesion	5.10 Which of the following statements best describe the situation of the civil servants in the location? (Note: this includes civil servants, teachers, nurses, police, etc.)	Yes
Social cohesion	6.1 How concerned are residents about explosive devices, such as mines, UXOs and IEDs?	Yes
Social cohesion	6.2 How concerned are residents about violence from or between security forces or armed groups?	Yes
Social cohesion	6.3 Has the main actor in charge of security in this location changed in the last 3 months?	Yes
Social cohesion	6.4 How concerned are residents about communal tensions in this location/neighborhood?	Yes
Social cohesion	6.5 Does this community need reconciliation with the different communities inside the Municipality or nearby Municipalities to achieve a peaceful co-existence and prevent further violence?	Yes
Social cohesion	6.6 Are restrictions of movement due to checkpoints or other security reasons affecting the daily life of current residents?	Yes
Social cohesion	6.7 From the following situations, which one best describes normal public life in the location now? For example, going to the market, kids playing, attending tea shops, picnics, etc.	Yes
Social cohesion	6.8 Are residents from this location able to access nearby functioning offices/courts for civil and criminal justice matters?	Yes
Social cohesion	6.9 Are residents from this location able to access formal or informal conflict resolution forum?	Yes
Social cohesion	6.10 Are there displaced families originally from this location who are not allowed to return? (Note: prevented from return by the community, local authorities, security forces, etc.)	Yes
Social cohesion	6.11 Are there are private residences occupied without permission (not family or friends) in the location?	Yes
Social cohesion	6.12 Are there public spaces available that allow residents to socialise freely and safely? (e.g. public parks, libraries, etc.)	Yes
Social cohesion	6.13 Are civil society organizations operating in the area?	Yes
Hazards	7.1 What hazard occurred with the highest frequency in this community in the last 2 years?	Yes
Hazards	7.2 What were the impacts of the last hazard on the lives of residents in this area/community?	No
Hazards	7.3 Have you observed any of the following changes in weather patterns over the last 10-30 years in this community?	Yes

Hazards	7.4 What were the impacts of these changed weather patterns for the residents?	No
Hazards	7.5 Are residents taking measures to adapt to hazards or weather change as described before?	Yes
Hazards	7.6 Which of the following statements better describes the level of resilience of shelters to hazards over the past 2 years in the area?	No
Hazards	7.7 Which of the following statements better describes the level of resilience of other infrastructure (roads, telecom etc) to hazards over the past 2 years in the area?	Yes
Hazards	7.8 Which of the following best describes the proportion of land that can be affected by hazards?	Yes
Hazards	7.9 Does the location have pre and post disaster community gathering place? (Yes / No)	Yes
Hazards	7.10 Does the location have an Early Warning System (EWS) for disasters? (Yes / No)	Yes
Hazards	7.11 Which of the following best describes the organization and participation of community members in community hazard mitigation activities	Yes

APPENDIX B - STABILITY INDEX DERIVATION

This appendix provides technical details on the calculation of the derivation of the Stability Index for municipalities (*baladiyat*). Since the survey was conducted at the community (muhalla) level, the index is first calculated for communities and then aggregated to municipalities. The construction of the index is done in three stages: 1) statistical modelling 2) variable selection and scoring and 3) aggregation.

Stability Index for Communities (*Muhallas*)

In the first stage, a statistical model is fitted to identify factors that are associated with the stability of the surveyed communities. A binary dependent (outcome) variable is constructed using responses to three proxy questions in Table 10 (See page 18). A community that meets baseline conditions for all 3 questions is considered stable (y=1), otherwise it is considered unstable (y=0).

Table 12 Examples of Questions and Responses by Condition

Interview Question	Response	Condition
5. Are the small businesses (private sector) in this location currently operating? This category includes small companies, such as shops or bakeries	1– Most or all businesses are open	Baseline (x=0)
	2 – Some businesses are open	Non-optimal (x=1)
	3 – None of the businesses are open	Non-optimal (x=1)
5.10 Which of the following statements best describe the situation of the civil servants in the location? (Note: this includes civil servants, teachers, nurses, police, etc.)	1 – Most or all civil servants are back in the location and have restarted their work	Baseline (x=0)
	2- Some civil servants are back in the location and have restarted their work	Non-optimal (x=1)
	3- None of the civil servants are back in the location	Non-optimal (x=1)
7.7. Which of the following statements better describes the level of resilience of other infrastructure (roads, telecom etc) to hazards over the past 2 years in the area?	1. The infrastructure is resilient to hazards	Baseline (x=0)
	2. The infrastructure is not resilient to hazards	Non-optimal (x=1)

A set of 40 explanatory variables which capture the information about livelihoods, basic services, social cohesion and disaster risk reduction measures and control variables are used as independent variables. Most variables in the original survey are nominal. Such variables were recoded into baseline (x=1) and non-optimal (x=0) values. An example on how responses are recoded is shown in Table 12. For control variables, the indicator variable for urban/rural location and the number of IDPs in a community were included.

Since the outcome variable is binary, the logistic regression model is fit the data, The model takes the form:

$$p(Y = y) = \frac{1}{1 + e^{-\beta x}}$$

Where y is the outcome variable, i.e., instability, e is a constant, β is a vector of model parameter (or weights) and x is a vector of community characteristics (independent variables). The resulting probability ranges from 0 to 1.

In the second stage, the explanatory variables that are found statistically significant in the first stage are assigned a score that is proportional to the degree of statistical association they have with the outcome variable (stability). First, model coefficients are transformed into odds ratios. Then, odds ratios are renormalized to sum up to 100 for variables within each of the three key themes.. Each community is then scored against all three themes on 100-point scale, with higher scores indicating more stable communities. Lastly, the Stability Index for communities is computed as the average score across the three key themes.

In the third and final stage, the Stability Index for municipalities is computed by aggregating the values for key theme of their respective communities. For this aggregation, the harmonic mean is used to penalise the index for municipalities that have less stable communities. Once the themes are aggregated, their scores are averaged to derive the Stability Index for municipalities.

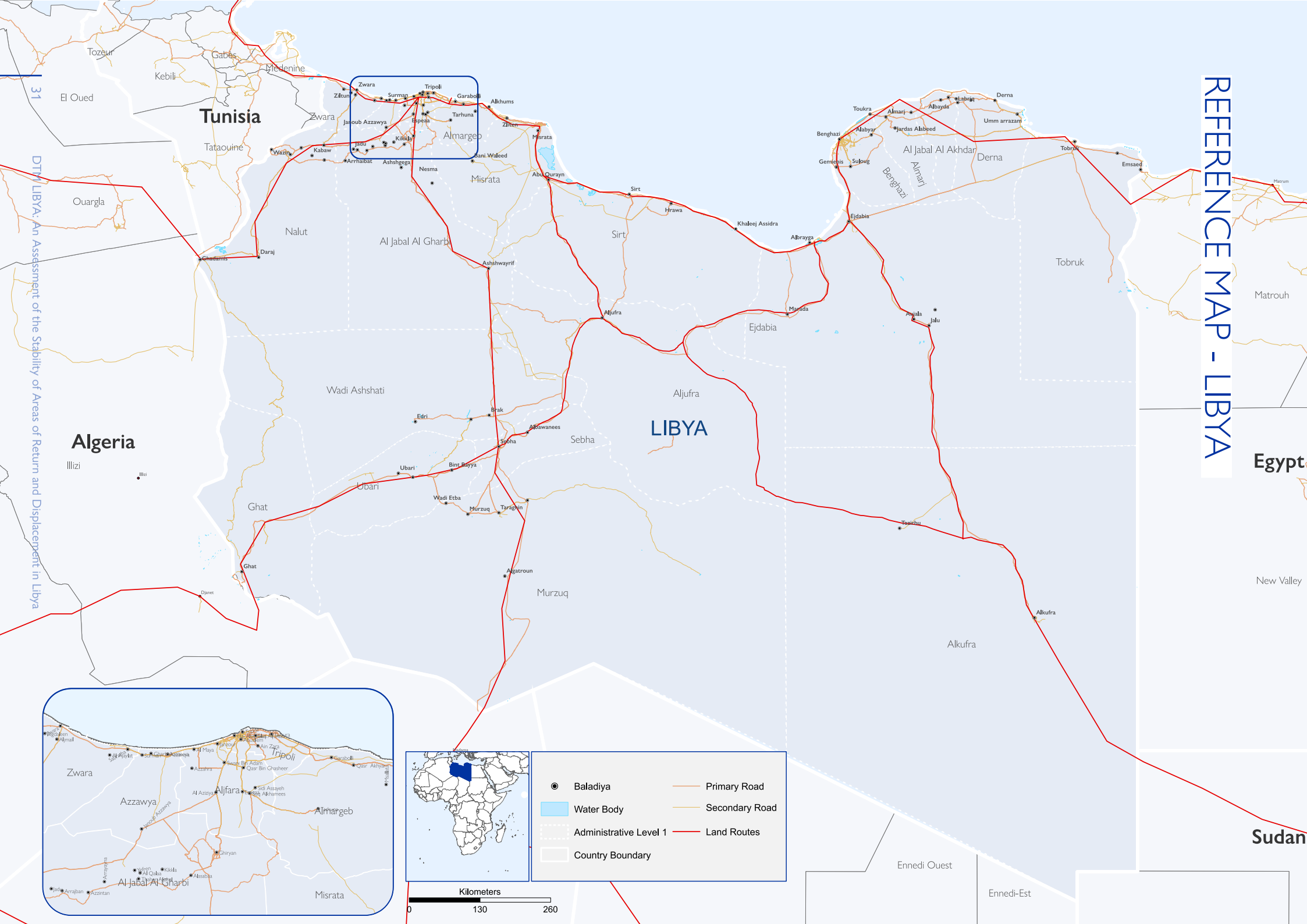
APPENDIX C - STABILITY INDEX TABLE

ID	Code	Name (EN)	Name (AR)	Index	Rank	Group	Livelihoods and Basic Services	Social Cohesion	DRR Measures
1	LY021501	Al Ajaylat	العجيلات	100,0	1	High	100,0	100,0	100,0
2	LY021207	Al Aziziya	العزيزية	100,0	1	High	100,0	100,0	100,0
3	LY021610	Arrhaibat	الرحيبات	100,0	1	High	100,0	100,0	100,0
4	LY021209	Azzahra	الزهراء	100,0	1	High	100,0	100,0	100,0
5	LY010501	Ejkherra	إجخرة	100,0	1	High	100,0	100,0	100,0
6	LY010305	Gemienis	قمينس	100,0	1	High	100,0	100,0	100,0
7	LY020901	Ghadamis	غدامس	100,0	1	High	100,0	100,0	100,0
8	LY021609	Jadu	جادو	100,0	1	High	100,0	100,0	100,0
9	LY010103	Alqubba	القبة	99,1	2	High	97,2	100,0	100,0
10	LY020907	Daraj	درج	99,1	2	High	97,2	100,0	100,0
11	LY021004	Garabolli	القره بولي	99,1	2	High	97,2	100,0	100,0
12	LY010702	Tazirbu	تازربو	99,1	2	High	97,2	100,0	100,0
13	LY021607	Kikkla	ككلة	92,4	3	High	77,2	100,0	100,0
14	LY021105	Abusliem	ابوسليم	85,7	4	Medium	86,1	100,0	71,0
15	LY021603	Alasabaa	الأصابعة	85,0	5	Medium	100,0	100,0	55,0
16	LY010602	Albayda	البيضاء	85,0	5	Medium	100,0	100,0	55,0
17	LY020902	Alharaba	الحرابة	85,0	5	Medium	100,0	100,0	55,0
18	LY021608	Arrajban	الرجبان	85,0	5	Medium	100,0	100,0	55,0
19	LY021611	Arrayayna	الرياينة	85,0	5	Medium	100,0	100,0	55,0
20	LY010303	Suloug	سلوق	85,0	5	Medium	100,0	100,0	55,0
21	LY021204	Espeaa	السبيعة	84,1	6	Medium	97,2	100,0	55,0
22	LY021201	Sidi Assayeh	سيدي السايح	84,1	6	Medium	97,2	100,0	55,0
23	LY010403	Tobruk	طبرق	84,1	6	Medium	97,2	100,0	55,0
24	LY010302	Toukra	توكرة	84,1	6	Medium	97,2	100,0	55,0
25	LY021606	Ghiryan	غريان	82,9	7	Medium	87,8	60,9	100,0
26	LY021101	Suq Aljumaa	سوق الجمعة	82,7	8	Medium	77,2	100,0	71,0
27	LY010502	Jalu	جالو	82,6	9	Medium	97,2	100,0	50,7
28	LY021104	Tripoli	طرابلس	81,8	10	Medium	90,4	100,0	55,0
29	LY021301	Azzawya	الزاوية	81,4	11	Medium	89,2	100,0	55,0
30	LY010503	Aujala	أوجلة	81,3	12	Medium	88,9	100,0	55,0
31	LY010201	Jardas Alabeed	جردس العبيد	81,3	12	Medium	88,9	100,0	55,0
32	LY021102	Tajoura	تاجوراء	80,9	13	Medium	85,7	100,0	57,1
33	LY021504	Aljmail	الجميل	80,4	14	Medium	82,4	100,0	58,8
34	LY021601	Nesma	نسمة	80,2	15	Medium	85,7	100,0	55,0
35	LY021303	Gharb Azzawya	غرب الزاوية	79,7	16	Medium	84,1	100,0	55,0
36	LY021401	Misrata	مصراتة	78,7	17	Medium	88,2	85,4	62,5

37	LY021106	Hai Alandalus	حي الأندلس	78,3	18	Medium	80,0	100,0	55,0
38	LY021203	Qasr Bin Ghasheer	قصر بن غشير	78,3	18	Medium	80,0	100,0	55,0
39	LY021202	Suq Alkhamees	سوق الخميس	78,3	18	Medium	80,0	100,0	55,0
40	LY021302	Surman	صرمان	78,3	18	Medium	80,0	100,0	55,0
41	LY021205	Swani Bin Adam	سواني بن آدم	78,3	18	Medium	80,0	100,0	55,0
42	LY021001	Alkhums	الخمس	74,7	19	Medium	77,2	100,0	47,0
43	LY010102	Derna	درنة	74,7	19	Medium	77,2	100,0	47,0
44	LY021103	Ain Zara	عين زارة	74,6	20	Medium	80,0	43,8	100,0
45	LY021206	Janzour	جنزور	74,1	21	Medium	80,4	53,9	88,0
46	LY032204	Murzuq	مرزق	71,7	22	Medium	86,1	58,2	71,0
47	LY032101	Ghat	غات	71,1	23	Medium	100,0	58,2	55,0
48	LY010401	Emsaed	امساعد	71,0	24	Medium	97,2	60,9	55,0
49	LY032203	Taraghin	تراغن	70,2	25	Medium	10,7	100,0	100,0
50	LY031902	Albawanees	البوانيس	70,1	26	Medium	97,2	58,2	55,0
51	LY010701	Alkufra	الكفرة	67,3	27	Medium	100,0	100,0	2,0
52	LY020802	Hrawa	هراوة	67,3	27	Medium	100,0	100,0	2,0
53	LY020903	Kabaw	كاباو	67,3	27	Medium	100,0	100,0	2,0
54	LY032003	Ubari	أوباري	67,3	27	Medium	100,0	100,0	2,0
55	LY021402	Zliten	زليتن	66,6	28	Medium	81,5	63,4	55,0
56	LY020908	Baten Aljabal	باطن الجبل	66,4	29	Medium	97,2	100,0	2,0
57	LY010301	Alabyar	الأبيار	65,3	30	Medium	40,8	100,0	55,0
58	LY021002	Msallata	مسلاتة	64,1	31	Medium	89,5	100,0	2,9
59	LY010202	Almarj	المرج	64,0	32	Medium	37,1	100,0	55,0
60	LY010105	Labriq	الأبرق	63,9	33	Medium	89,2	100,0	2,5
61	LY010506	Albrayga	البريقة	63,6	34	Medium	88,9	100,0	2,0
62	LY020801	Khaleej Assidra	خليج السدرة	63,6	34	Medium	88,9	100,0	2,0
63	LY021003	Qasr Akhyar	قصر الأخيار	63,1	35	Medium	85,2	43,8	60,4
64	LY031803	Algurdha Ashshati	القرضة الشاطئ	62,7	36	Medium	14,5	73,6	100,0
65	LY032205	Wadi Etba	وادي عتبة	62,7	36	Medium	86,1	100,0	2,0
66	LY020905	Nalut	نالوت	62,4	37	Medium	81,7	100,0	5,6
67	LY010101	Umm Arrazam	ام الرزم	61,6	38	Medium	86,1	43,8	55,0
68	LY031701	Aljufra	الجفرة	61,5	39	Medium	95,2	77,8	11,5
69	LY021505	Rigdaleen	رقدالين	61,1	40	Medium	28,3	100,0	55,0
70	LY020904	Alhawamid	الحوامد	60,7	41	Medium	80,0	100,0	2,0
71	LY032201	Alsharguiya	الشرقية	60,7	41	Medium	14,3	89,3	78,6
72	LY010505	Marada	مرادة	60,7	41	Medium	80,0	100,0	2,0
73	LY021506	Ziltun	زلطن	59,7	42	Medium	77,2	100,0	2,0

74	LY021503	Zwara	زوارة	59,7	42	Medium	77,2	100,0	2,0
75	LY010402	Bir Alashhab	بير الأشهب	59,6	43	Medium	80,0	43,8	55,0
76	LY010601	Shahhat	شحات	58,7	44	Medium	69,8	100,0	6,1
77	LY021605	Yefren	يفرن	58,0	45	Medium	83,3	87,4	3,2
78	LY021403	Abu Qurayn	ابو قرين	56,2	46	Medium	85,7	10,2	72,7
79	LY010104	Alqayqab	القيقب	55,8	47	Medium	12,4	100,0	55,0
80	LY032001	Bint Bayya	بنت بية	55,4	48	Medium	88,9	73,6	3,9
81	LY021614	Thaher Aljabal	ظاهر الجبل	54,8	49	Medium	9,4	100,0	55,0
82	LY010504	Ejdabia	اجدابيا	54,2	50	Medium	93,0	67,5	2,0
83	LY021502	Sabratha	صبراتة	53,8	51	Medium	80,1	66,1	15,1
84	LY021602	Azzintan	الزنتان	53,2	52	Medium	82,8	72,2	4,7
85	LY010203	Assahel	الساحل	52,2	53	Medium	89,1	64,6	2,9
86	LY021005	Tarhuna	ترهونة	51,6	54	Medium	24,0	75,7	55,0
87	LY032202	Algatroun	القطرون	49,3	55	Low	87,8	58,2	2,0
88	LY021304	Janoub Azzawya	الزاوية جنوب	48,1	56	Low	12,4	60,9	71,0
89	LY020906	Wazin	وازن	47,7	57	Low	97,2	43,8	2,0
90	LY021208	Al Maya	المايه	47,3	58	Low	33,0	100,0	8,8
91	LY020803	Sirt	سرت	43,1	59	Low	17,0	57,2	55,0
92	LY031901	Sebha	سبها	41,1	60	Low	37,2	82,4	3,9
93	LY021404	Bani Waleed	بني وليد	40,3	61	Low	47,6	70,0	3,3
94	LY031802	Edri	إدري الشاطئ	37,7	62	Low	22,8	7,4	83,0
95	LY010304	Benghazi	بنغازي	35,1	63	Low	87,1	14,1	4,0
96	LY021612	Ashshgega	الشقيقة	30,9	64	Low	81,6	5,5	5,5
97	LY032002	Alghrayfa	الغريفة	30,6	65	Low	16,0	70,0	5,6
98	LY031801	Brak	براك الشاطئ	29,9	66	Low	83,8	2,0	3,9
99	LY021613	Ashshwayrif	الشويريف	27,9	67	Low	26,6	2,0	55,0
100	LY021604	Al Qalaa	القلعة	27,2	8	Low	16,8	60,9	3,8

REFERENCE MAP - LIBYA



IOM's Displacement Tracking Matrix (DTM) tracks and monitors population movements in order to collate, analyze and share information to support the humanitarian community with the needed demographic baselines to coordinate evidence-based interventions.

DTM
IOM DISPLACEMENT TRACKING MATRIX

To consult all DTM Libya reports, datasets, static and interactive maps and dashboards, please visit:

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