West Africa Mapping Project – Final Report

Appendix:

Detailed methodology

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Section 1: Project Overview

The American Red Cross West Africa Mapping Project was created in response to a dearth of publically available community level information in the shared border regions of Guinea, Liberia and Sierra Leone. At its foundation, the project was designed to collect GPS coordinates and community names for all communities located within 15km of the shared borders. From these communities, the one hundred most vulnerable communities would be revisited to conduct detailed mapping. This detailed mapping would add information to every building within selected communities and identify key infrastructure (health facilities, markets, transit points, etc.).

In order to select the most vulnerable one hundred communities, a vulnerability index was created through supplemental data collected during initial community visits. Section two of this report outlines the methodology used to create the selection criteria for communities.

Through this project, information was collected from 7,200 communities, 3,421 in Guinea, 2,449 in Sierra Leone and 1,330 in Liberia. Additionally, 104 of the most vulnerable communities were mapped in detail.

Section 2: Index Methodology

Purpose

The lack of community level information and the homogenous nature of rural communities in the border areas of Guinea, Liberia and Sierra Leone made it difficult to create a metric that will accurately reflect community vulnerability. Constructing and collecting data for an index without a supporting methodology and data would have risked a ceiling or floor effect, in which all communities would share similar characteristics and thus would prohibit segmentation.

To determine accepted measures of vulnerability, a literature review of academic, humanitarian and government reports was conducted. After measures of vulnerability were determined, an analysis of indicator questions was conducted using the ***Demographic and Health Survey (DHS)*** results for each country. Analysis of this data centered on determining which indicators of vulnerability were strongly correlated within communities but not across communities, and whether the index results would be normally distributed. The strong correlation within communities allows for the identification of characteristics unique to each community and allows for any community member to provide a response that will likely be representative of the larger community. Additionally, the normal distribution allows for improved classification and identification of outliers and extremes on the vulnerability scale.

Through this review, questions concerning access to water, sanitation, household characteristics and healthcare were found to be good indicators of vulnerability and the constructed index from the DHS data formed the desired normal distribution. In addition to the final questions included in the vulnerability index, questions about access to markets and community experience with events that can disrupt livelihoods were included in the community survey at the request of stakeholder organizations. Absent of supporting data, it was uncertain whether there would be a ceiling or floor effect with the supplementary questions. However, these questions, such as community experience with Ebola, are important to the Red Cross and the larger humanitarian community.

Data Review

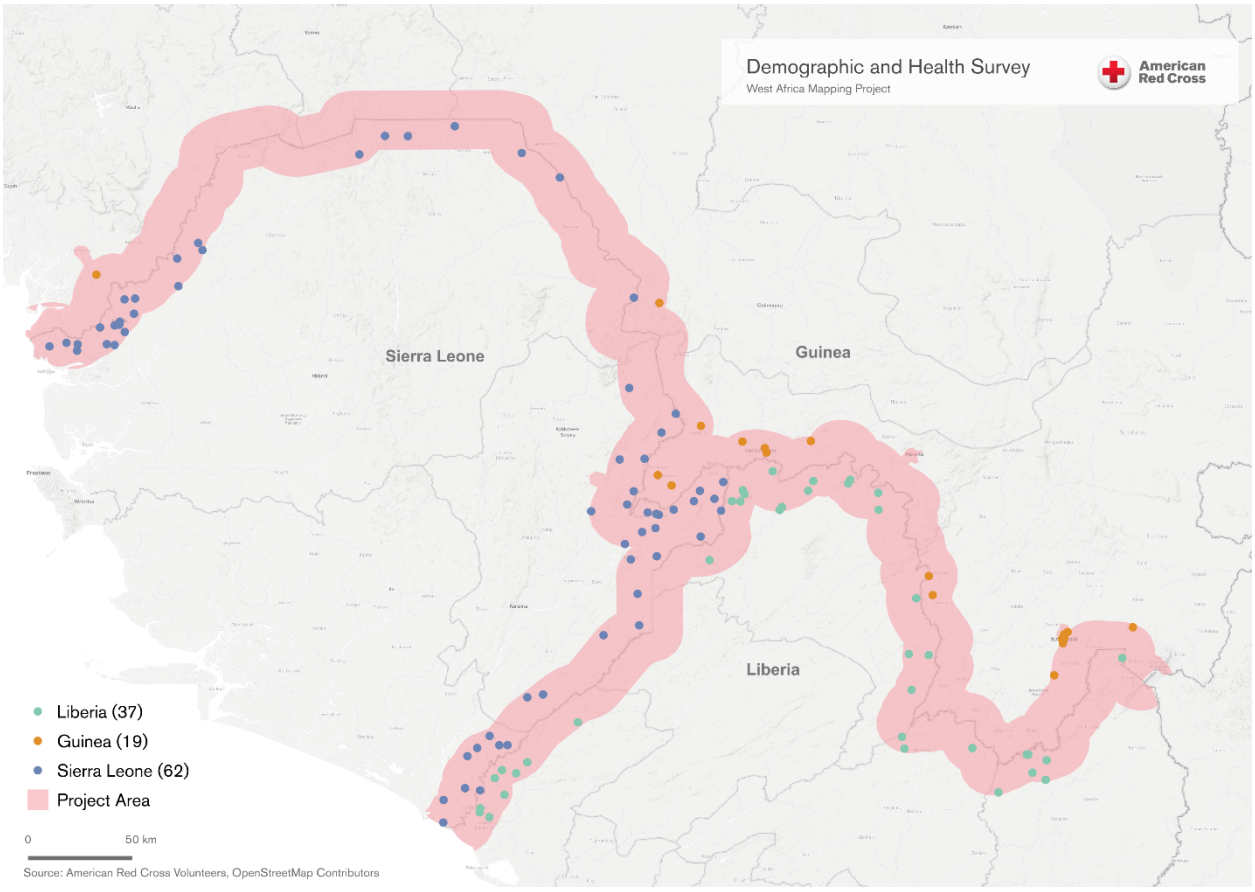
The vulnerability index was constructed utilizing survey data collected through interviews with a single key informant (community leader, health worker, etc.) residing within each visited community. Through interviews with these key informants, sectoral vulnerability scores were coalesced and a final score, representing the community's vulnerability, was assigned to each individual community.

As vulnerability is temporal, incorporates several factors and is unique to geography, a full literature-review of reports issued by international organizations, NGO's and academia was conducted in order to determine

established indicators of vulnerability and identify the vulnerability measures most relevant to the border regions. Through this literature review, the following sectors were identified as correlating with vulnerability and resilience.

- Economic Stability
- Institutional Stability
- Access to Healthcare
- Infrastructure Available
- Community and Social Cohesion

After identifying these core sectors, questions from the ***Demographic and Health Survey*** that captured information on these sectors were selected for analysis. The DHS data consists of clusters of approximately 30 household interviews within randomly selected communities. Each dataset is accompanied by a GPS data set. In order to select communities that are within the project area, GPS coordinates were overlaid with the Red Cross's program areas and communities that would be eligible for mapping were selected. Analysis was conducted only on that subset of communities. In total, 37 communities were analyzed for Liberia (n=1086), 19 communities in Guinea (n=401) and 62 communities in Sierra Leone (n=1788).[1]

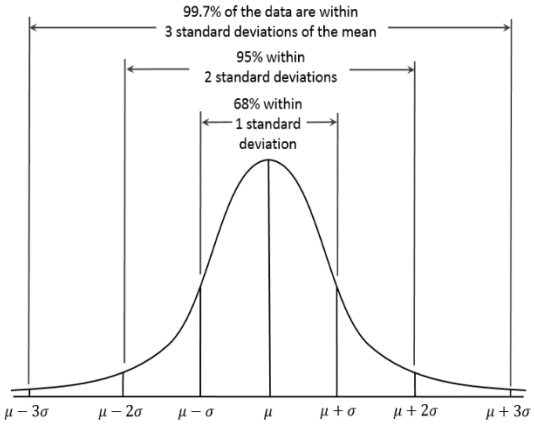


One potential problem in the construction of this index was the assumption that the target communities will be homogenous and share many indicators of vulnerability. This was assumed because of the rural nature of the communities and the lack of access to goods and services. Complicating this issue was the fact that, as opposed to traditional representative surveys, such as the DHS, only one person would be interviewed during the mapping

[1] For more information on the DHS program and the data available, please visit http://www.dhsprogram.com/.

exercise and his/her responses would be taken as representative of the community. This created difficulties in establishing representativeness and determining error associated with community level data.

In order to account for these difficulties, an analysis of intra-class correlation (ICC) was conducted for each selected indicator variables. ICC is a method of determining how correlated responses are within a cluster and across clusters. An ICC of 1 would indicate that responses are unique to a cluster and all responses within the cluster are similar across inhabitants. Conversely, an ICC of 0 would indicate that responses are similar across communities and/or that responses vary greatly within a community. Analysis of ICC was conducted using the R statistical package ICC.[2]



Gaussian Distribution
Source: By Dan Kernler - Own work, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=36506025

Utilizing this analysis, an index was formed with the express goal of maximizing the ICC and variance of the index. By maximizing these factors, the index would provide a score that identifies the most vulnerable communities while minimizing the error that arises from a single individual responding for community level characteristics. In addition to maximizing these values, the resulting index would form a Gaussian distribution in which the majority of communities have moderate vulnerability. Those communities outside two standard deviations would serve as the outliers, with the outliers on the left side of the mean representing the least vulnerable populations and those outliers on the right side representing the most vulnerable communities.

Results[3]

Through the literature review and analysis of the DHS data, it was determined that a community's source of water, primary toilet facilities, floor composition and distance to hospital were strong indicators of infrastructure and health outcomes. Further analysis revealed that responses to these questions had moderate-strong ICC and the continuous structure of certain questions increased variance. Furthermore, interactions of related variables helped to increase the ICC and variance of the index.

Additional analysis was conducted in order to determine other variables would be appropriate to include within the index. Indicators of improved infrastructure and access to information were analyzed using questions about access to media devices (radio, television), access to electricity and cell phones. Through this analysis, it was determined that only a small percentage of the communities had access electricity, while nearly every cluster had high percentages owning a radio or cell phone. Including these questions would lead to a floor effect with no unique data gained.

Incorporation of Stakeholder Feedback

After presenting the initial questionnaire to organizations working in the border areas, it was requested that data on linkages amongst communities be included within the data. It was determined to include questions related to where communities traveled for markets, to receive healthcare and to worship. Using this data, the American Red Cross research team was able to create "hub-zones" with relative measures of communities traveling to these

[2] M.E. Wolak, D.J. Fairbairn, Y.R. Paulsen (2012) Guidelines for Estimating Repeatability. Methods in Ecology and Evolution 3(1):129-137.

[3] A total of 201 individuals were ineligible due to missing data. In only two sampling points (55, 216) was exclusion above 50% of the cluster. Removing these two outliers, the average exclusion was 16.18%.

hubs. In creating these zones, the detailed mapping was able to focus on high population areas relatively high population movement.

This approach reframed the initial definition of vulnerability. Instead of smaller disconnected communities that would be vulnerable to economic shocks and natural disasters, the vulnerability score was weighted towards larger urban areas that would be vulnerable to the spread of infectious diseases. The data exists to create indices in a variety of ways, but in order to maximize the utility of mapping activities, it was decided to prioritize vulnerability of communities susceptible to disease uptake and transmission.

Figure 1 below outlines the scoring that was used to normalize the data into vulnerability scores.

Figure 1: Final Index Scoring

Score	Subunit	Percentile	Vulnerability Score
Score 1: Water Score	Improved Water	0-0.2	1
		0.21-0.4	2
		0.41-0.6	3
		0.61-0.8	4
		0.8-1	5
	Unimproved Water	0-0.2	6
		0.21-0.4	7
		0.41-0.6	8
		0.61-0.8	9
		0.8-1	10
Score 2: Sanitation Score	Improved Toilet Improved Floor (Dung/Mud)	NA	2
	Improved Toilet Unimproved Floor (Dung/Mud)		4
	Unimproved Toilet + Improved Floor		6
	Unimproved Toilet +Unimproved Floor		8
Score 3: Hospital Score	# of Communities Traveling to Target Community's Hospital	No Hospital In Community	0
		0-0.2	2
		0.21-0.4	4
		0.41-0.6	6
		0.61-0.8	8
		0.8-1	10
Score 4: Women's Health Score	# of Communities Traveling to Target Community's Women's Health Provider	No Women's Health In Community	0
		0-0.2	2
		0.21-0.4	4
		0.41-0.6	6
		0.61-0.8	8
		0.8-1	10
Score 5: Market Score	# of Communities Traveling to Target Community's Market	No Market In Community	0
		0-0.2	2
		0.21-0.4	4
		0.41-0.6	6
		0.61-0.8	8

		0.8-1	**10**
Score 6: Worship Score	**# of Communities Traveling to Target Community for Worship**	**No Communities Traveling to Worship**	**0**
		0-0.2	**2**
		0.21-0.4	**4**
		0.41-0.6	**6**
		0.61-0.8	**8**
		0.8-1	**10**
Score 7: Household Size	**Estimate of Households in the Community**	**0-0.1**	**1**
		0.11-0.2	**2**
		0.21-0.30	**3**
		0.31-0.4	**4**
		0.41-0.5	**5**
		0.51-6	**6**
		0.61-7	**7**
		0.71-8	**8**
		0.81-9	**9**
		0.91-1	**10**
Score 8: Total Disasters	**Sum of Reported Disasters (Reports of Ebola in Community added an additional point to vulnerability)**	**1**	**1**
		2	**2**
		3	**3**
		4	**4**
		5	**5**
		6	**6**
		7	**7**
		8	**8**
		9	**9**
Maximum Total Vulnerability			**77**
Average Total Vulnerability			**24.7**

Section 3: Survey Instrument

The research methodology was designed by the American Red Cross's Monitoring and Evaluation Advisor utilizing external data sources and document review. The questionnaire was programmed for electronic data collection using OpenDataKit (ODK). The English language version of the form was reviewed by field team leaders in all three countries. The questionnaire was translated into French by Guinean Red Cross staff members. Where communities did not speak English or French, the data collector would translate the questionnaire on the fly to the local language.

In addition to translation of the questionnaire, Medicins Sans Frontiers staff members added additional questions to the form. These questions included administrative divisions, neighborhood information, access to cell phone coverage and radio coverage. In creating these new administrative levels, the data levels for Liberia became different from those in both Guinea and Liberia. In Liberia's data, only one point was taken for a community, regardless of size while in Guinea and Sierra Leone multiple points were taken for larger towns at the neighborhood level. Comparing results between countries thus requires some aggregation of communities at the town level to assign a single point. A data dictionary has been included with the data distribution and the full data collection form is available upon request.

Proper calculation of the vulnerability index required complete information from a community. Protocols dictated that the enumerator would attempt to speak first with the community leader, followed by community health workers living in these communities. If a person did not know the response to a question, the interview was terminated and the enumerator was required to find someone more knowledgeable about the community. This, however, was not done in practice and some communities currently have incomplete community vulnerability information. Only those that had complete information had vulnerability scores calculated and were eligible for selection in second round mapping.

In Liberia, the OpenMapKit form, which was used to collect building information on treatment facilities, was included within the ODK form. Using this system, if a community had a treatment facility located within it, at the end of the ODK form, the enumerator was instructed to proceed with an OMK form. However, due to the interviewing multiple people within the community and uncertainty about locations of health facilities, enumerators struggled to properly utilize the OMK form when it was connected to the ODK form. For Guinea and Sierra Leone, the OMK form was separated from the ODK form and enumerators were instructed how to navigate between the two programs.

ODK and OMK are cloud-based mobile apps, however, in order to upload data an internet or cell signal is required. The project area in West Africa, however, was so large and remote that volunteers would be offline and inaccessible for days or weeks at a time. To bridge this gap, Portable OpenStreetMap (POSM) was developed.

POSM is an offline server with a captive WiFi portal that supports all of the necessary field tools: FieldPapers, OpenMapKit, OpenDataKit, OpenDroneMap, and offline editing of OpenStreetMap. This means that a user can pre-download files for an area of interest and then take POSM to the field, where it can be used to create a map-based survey form, push it onto a group of phones, retrieve the resulting data from the phones, and edit these to add them into OpenStreetMap. After the team returns to an area with a reliable internet connection, they resolve any data conflicts and push the data up to OpenStreetMap, where they're available for anyone to download, edit, and use.

Section 4: Survey Data Collection

Fieldwork was conducted in a rolling basis for all countries. Data was first collected in Liberia, followed by collection in Guinea and Sierra Leone was conducted last. For all countries, the American Red Cross and MSF over-recruited for the enumerator position and those enumerators not meeting quality standards were removed from the pool of enumerators.

Liberia

In Liberia, field team leaders were first trained in Monrovia for two days by American Red Cross staff members. Following this training, field team leaders traveled with ARC staff to their respective regions and conducted a two-day training with enumerators in which the form was pre-tested at the training site.

Initial data collection began in Liberia on March 21st, 2016 and ended on April 1st, 2016. An in-depth review of the data took place to identify areas that were believed to have been missed in the initial data collection. Field in Liberia resumed on April 23rd and was completed May 7th. A total of 36 enumerators worked on the Liberia portion of the project.

Guinea

Training of field team leaders in Guinea was led by Medicins Sans Frontiers staff members. The questionnaire was pre-tested by field team leaders during this training and the data reviewed by Red Cross staff members. Following this training, all enumerators and field team leaders traveled to Guekadou for a full training led by MSF and the American Red Cross. Initial fieldwork for Guinea began on May 1st, 2016 and ended May 15th. After quality control

review and an analysis of missing communities was conducted, rield operations restarted May 22nd and continued until completion on May 27th. A total of 56 enumerators worked on the Guinea portion of this project.

Sierra Leone

As with Guinea, initial training of field team leaders was hosted by MSF in Freetown. Following the team leader training, all enumerators traveled to Freetown for an intensive training. Following the training, field teams traveled with American Red Cross staff members and GIS project managers to respective regions. Initial data collection began on June 6th and continued until June 24th. Second round data collection began July 8th and ended July 6th. A total of 34 enumerators worked on the Sierra Leone portion of the project.

Section 5: Data Quality Review

The American Red Cross instituted a variety of quality control measures in order to ensure the fidelity and utility of the data. The first mechanism in ensuring data quality was field monitoring by ARC staff, MSF staff and field team leaders. In Sierra Leone and Guinea, a site monitoring form was to be used by supervisors at interviewing sites to capture feedback from enumerators and respondents. This feedback was reviewed daily by headquarters staff and communicated to team leaders and supervisors. This allowed for quick response on feedback received on protocols, issues with the form and issues of geography and environment. Due to limited technological capacity in Guinea, it was determined to forego the monitoring form and instead concentrate on direct field observation by ARC and MSF supervisors.

The ARC also created a data review program and website to track daily progress, completions and quality. This program assessed the number of fully completed interviews by enumerator, average completion time for interviews[4] and accuracy of data. Results from this program were sent to team leaders on a daily basis to help adjust issues in field and talk to enumerators having difficulty correctly implementing the survey.

The final mechanism for ensuring data quality were call-backs to visited communities. Following completion of data collection, twenty percent of each enumerator's interviews were randomly selected for call-backs. Field team leaders would then call communities and ask a short survey to verify that enumerators had visited the area and that responses for key questions matched against the initial interviews. Due to poor telecommunications in these rural areas, approximately 50% of these call-backs were successful. Overall, call-backs validated the data with only slight deviations in responses. Due to the low completion rates of call-backs, it was also not possible to project results to the quality of the larger datasets.

Section 6: Issues During Field

It was discovered during fieldwork that when a supervisor would review the survey form, the end time of the interview would be overwritten. Because of this error, it is not possible to calculate an average time for an interview to be completed. However, when analyzing interviews that took less than two hours, the average interview is approximately 25 minutes. When reviewing the data for quality control purposes, interviews over two hours were removed from analysis.

An additional issue with accurately recording the interview length, it was found that some supervisors would overwrite GPS coordinates collected in field. This has led to a clustering of communities in certain regions into central areas where supervisors were reviewing questionnaires. **It was determined to leave these data points in the full data as they provide information about communities and can be utilized in connections to central towns and markets**. Future iterations of the data may correct for this clustering and the American Red Cross hopes that data-users will identify community GPS coordinates for correction.

[4] See Data Issues Sectoin

Delays in fieldwork led to difficulties in data collection in Sierra Leone. Fieldwork in Sierra Leone began at the start of the rainy season which led to increased delays in data collection and difficulty accessing communities in the river communities in Northwest Sierra Leone. To account for this, American Red Cross staff adjusted schedules, extended second round data collection and provided direct in-country support to enumerators.

Section 7: Detailed Mapping

Overview

Using the result of the vulnerability index from the rapid assessment survey 104 communities were selected for field-based detailed mapping; **26 in Liberia, 41 in Guinea, and 37 in Sierra Leone**. While the vulnerability score was taken into account, highly populated communities and regional spread of communities were taken into consideration to ensure the detailed mapping was included in all regions of the target area.

Once the target communities were identified, GIS analysts traced buildings and roads from satellite imagery for the selected communities to prepare the areas for detailed mapping and to assist with navigation. To prepare the volunteers, a second round of training sessions was held to introduce this element of the project and to plan the logistics of the mapping.

Using several unique survey forms created for the OpenMapKit application, volunteers returned to each of the 104 communities. They collected information on water sources, schools, medical facilities, and general points of interest likes places of worship, markets, stores, and services. Over the course of several weeks, volunteers combed the target communities to conduct the mapping. This work required 3-4 weeks for each country and took place from May through July 2016, beginning in Liberia and finishing in Sierra Leone. POSM devices were essential for this work, and enabled preparation of the volunteers' phones and retrieving of data in disconnected areas.

Quality Control

A workflow was created for the cleaning of the OMK data that was collected for the detailed mapping. While the surveys had many single choice answers, spelling errors in names, and superfluous tags were common in the data. The OpenStreetMap community has created tagging standards[5] for which the OMK surveys were based on. There was manual editing required to ensure adherence to these standards. Analysts at the the mapping hub established in Guinea were trained in this workflow. The workflow is available to be viewed on the American Red Cross GitHub page:

https://github.com/AmericanRedCross/workflows/blob/master/west-africa_data-cleaning.md

For new point data being added to OpenStreetMap, data was exported as a csv and cleaned using OpenRefine[6] which allowed for mass editing of data points. The data was then loaded into the Java OpenStreetMap (JOSM) editor[7], and the points were checked community by community to ensure correct tagging, as guided by the OpenStreetMap Wiki. Cleaning the existing polygon data, however, was completed exclusively in JOSM, as the OSM ID values need to be preserved when uploading to OpenStreetMap.

After the data was initially cleaned in Guinea, a second round of review was carried out by GIS staff in Washington, DC, where the data was verified and uploaded community by community to OpenStreetMap. All data was tagged with "source=Red Cross Field Survey", and can be downloaded from the Humanitarian Data Exchange:

https://data.humdata.org/dataset/american-red-cross-west-africa-project

[5] OSM Standards Available at: http://wiki.openstreetmap.org/wiki/Map_Features
[6] Open Refine Available at: http://openrefine.org/
[7] JOSM Available at: https://josm.openstreetmap.de/

In addition to spelling errors and extra tags, issues that appeared in the data were tags that were outside of the tagging schema provided for the survey and GPS issues. Tags that were outside of the survey specifications were often covered by a preexisting tag found in the OSM Wiki; on rare occasions a new tag would need to be created. There were a number of instances where numerous data points were located directly on top of each other, which is indicative of a GPS error, and all the points being logged at the same spot. These points were deleted from the dataset as the locations could not be confirmed.

Data Release and Protection

All data related to the project has been uploaded on the Humanitarian Data Exchange. All identifying information used for call-backs and data validation has been removed from the publically available dataset. In addition to personally identifiable information, due to respondents providing names and locations of specific doctors and midwives, all names of treatment facilities and women's health facilities have been intentionally removed from the data. This information may be made available upon specific request to the American Red Cross. The full dataset, including contact information, is stored on a secure server and will not be made public.

The American Red Cross also plans to release the analysis, web application and R code used to create linkages and the index score on its Github page.

For inquiries on access to data or scripts, the American Red Cross can be contacted through the Humanitarian Data Exchange data page.

Appendices

ICC Results

Table 1: ICC and Variance Overview: Liberia						
Index Section	**Sectors Addressed**	**Question**	**ICC**	**Variance**	**Combined Index ICC**	**Combined Index Variance**
Water Score	Health/Infrastructure	Time to get water	0.11	0.19	.407	.996
	Health/Infrastructure	Water Source	0.47	0.46		
Toilet Score	Health/Infrastructure	Type of Sanitation facility	0.36	0.20	.43	1.37
Electricity/ Communication Score	Infrastructure, Economic Stability	Access to Electricity	0.00	0.01	**ICC for electricity is 0 and the presence of at least one communications device within each cluster allows for diffusion of information within and across clusters. It is recommended to exclude these items from the index**	
	Infrastructure/Community and Social Cohesion	Household Owns Radio	0.09	0.25		
	Infrastructure/Community and Social Cohesion	Household Owns Cell Phone	0.20	0.24		
Floor Score	Health	Improved floor vs. unimproved floor	0.26	0.22	.46	1.78
NDVI Score[8]	Economic Stability	NDVI	1	0.39	.44	1.73
Health Score	Health/Infrastructure	Health Time Recoded	0.64	1.09	.60	3.83

Table 2: ICC and Variance Overview: Guinea						
Index Section	**Sectors Addressed**	**Question**	**ICC**	**Variance**	**Combined Index ICC**	**Combined Index Variance**
Water Score	Health/Infrastructure	Time to get water	.15	.20	.42	1.11
	Health/Infrastructure	Water Source	.34	.29		
Toilet Score	Health/Infrastructure	Type of Sanitation facility	.88	.17	.65	1.43
Electricity/ Communication Score	Infrastructure, Economic Stability	Access to Electricity	.24	.06	**ICC for electricity is 0 and the presence of at least one communications device within each cluster allows for diffusion of information within and across clusters. It is recommended to exclude these items from the index**	
	Infrastructure/Community and Social Cohesion	Household Owns Radio	.12	.25		
	Infrastructure/Community and Social Cohesion	Household Owns Cell Phone	.51	.25		

[8] While having an ICC of 1 and a moderate variance, the data does not add much value to the index scores. Additional analysis should be conducted to determine how to better weight and incorporate remote sensing data into the index.

Floor Score	Health	Improved floor vs. unimproved floor	.51	.24	.72	2.03
NDVI Score[9]	Economic Stability	NDVI	It was determined in early stages that this would not be a good measure of vulnerability as NDVI would measure development around community.			
Health Score	Health/Infrastructure	Health Time Recoded	Not Available in DHS Data			

Table 3: ICC and Variance Overview: Sierra Leone						
Index Section	**Sectors Addressed**	**Question**	**ICC**	**Variance**	**Combined Index ICC**	**Combined Index Variance**
Water Score	Health/Infrastructure	Time to get water	.27	.20	.57	1.32
	Health/Infrastructure	Water Source	.57	.28		
Toilet Score	Health/Infrastructure	Type of Sanitation facility	.57	.24	.62	1.8
Electricity/ Communication Score	Infrastructure, Economic Stability	Access to Electricity	.01	.25	**ICC for electricity is 0 and the presence of at least one communications device within each cluster allows for diffusion of information within and across clusters. It is recommended to exclude these items from the index**	
	Infrastructure/Community and Social Cohesion	Household Owns Radio	.09	.00		
	Infrastructure/Community and Social Cohesion	Household Owns Cell Phone	.19	.24		
Floor Score	Health	Improved floor vs. unimproved floor	.18	.17	.62	1.81
NDVI Score[10]	Economic Stability	NDVI	--	--	--	--
Health Score	Health/Infrastructure	Health Time Recoded	--	--	--	--

Final Research Instrument

Liberia Mapping Project
Vulnerability Assessment Questionnaire
March 13, 2016, v.7

Section 1: Management

[9] While having an ICC of 1 and a moderate variance, the data does not add much value to the index scores. Additional analysis should be conducted to determine how to better weight and incorporate remote sensing data into the index.

[10] While having an ICC of 1 and a moderate variance, the data does not add much value to the index scores. Additional analysis should be conducted to determine how to better weight and incorporate remote sensing data into the index.

M-1. Interview Start Time

M-2. Interview End Time

M-3. Date

M-4. Device ID

M-5. Community GPS Coordinate

M-6. Attempt within community:

____ ____

995. No one else in the community is available

M-7. Administrative Information

M-8. Interviewer Number

Introduction Statement

Hello, my name is _____ and I am a volunteer with the Red Cross. We are currently conducting a research project to identify the location of communities throughout the country and collect basic information about the people that live in these communities. We are not providing any services to the communities and simply would like to learn more about communities throughout the country. We would like to ask you a few questions about the community in which you live. If you do not know the answer to a question or are uncomfortable with the question, you do not have to respond. Your identity and personal details will remain confidential and will not be shared with anyone. Are you willing to participate?

1. Yes **(Proceed)**
2. No **(End Interview)**

Section 2: Community Characteristics

Q-1. Name of Community: _____

Q-2. Alternative Name(s) **[Loop]**: _____

Q-3. Respondent's Name (For Back-Checking Purposes): _____

Q-4. Respondent's Phone Number (For Back-Checking Purposes): _____

9995. Respondent Does Not Have Phone
9998. Refused
9999. Don't Know

Q-5. Who is the best person to contact in this community in case of emergency?

_____

995. Respondent
998. Refused
999. Don't Know

Q-6. **(Ask if Q-5 not '995')** And what is this person's phone number? _____

995. Does not have a phone
998. Refused
999. Don't Know

Q-7. **(Ask if '995' in Q-5)** And may we share your contact information to use in case of future emergencies?

1. Yes
2. No

Q-8. How many households are in this community? If you don't know the exact number, what is your best estimate?

___ ___

(Note: Volunteer can adjust number if community does not appear to match the reported size)

Section 3: General Vulnerability

Q-9. Since the Ebola outbreak in the country, has this community experienced any of the following: (**Read List; Multiple Response)**:

1. Drought
2. Famine
3. Flooding
4. Landslide
5. Fire Disasters (Natural or Man-made)
6. Someone in this village contracting or dying from Ebola
7. Village Level Epidemic (Other than Ebola)

_____

97. Other: Specify _____ **[Loop]**
98. Refused
99. Don't Know

Q-10. **(Ask if '6' in Q-9)** And how many people in this community have become sick or died from Ebola?

____ ____

998. Refused
999. Don't Know

Section 4: Water Security

Q-11. And in general, what is the primary source of people's drinking water in this community?

Improved Water:

1. Piped water into dwelling, yard or plot
2. Public Tap or standpipe
3. Tubewell or borehole
4. Protected Spring
5. Protected Dug Well
6. Rainwater Collection

Unimproved Water:

7. Unprotected dug well
8. Unprotected spring
9. Cart with small tank or drum
10. Tanker Truck
11. Surface Water
12. Bottled Water

_____

97. Other: Specify _____
98. Refused (vol.)
99. Don't Know (vol.)

Q-12. How long does it take the **average person** in the community to go to the source of drinking water, get the water, and come back? **(In Minutes)**

____ ____ ____

9995. More than one day
9998. Refused
9999. Don't Know

Q-13. What kind of toilet facility do most people in this community usually use?

Improved Sanitation

1. Flush or pour flush to piped sewer system, septic tank or pit latrine
2. Ventilated improved pit (VIP) latrine
3. Pit latrine with slab
4. Composting toilet

Unimproved Sanitation

5. Flush or pour flush to everywhere (not piped)
6. Pit latrine without slab, or open pit
7. Bucket
8. Hanging toilet or hanging latrine

9. Shared or public facilities of any type
10. No facilities

_____

97. Other
98. Refused
99. Don't Know

Q-14. What is the main material people in this community have for the floors in their homes?

1. Earth/Sand
2. Dung
3. Wood Planks
4. Palm
5. Polished Wood
6. Vinyl or Asphalt Strips
7. Ceramic Tiles
8. Cement
9. Carpet

_____

97. Other
98. Refused (vol.)
99. Don't Know (vol.)

Section 5: Healthcare

Q-15a. When a person in this community becomes sick or injured, what is the name of the primary facility that person would go to for treatment? If it is not a facility, what is the name of the caregiver?

_____

9995. No Facility Available
9999. Refused/Don't Know

Q-15b. **(Ask if not '9995' in Q-15a)** And what kind of facility or person is this?

(Open-Ended with Pre-Codes)

1. Hospital operated by Liberian Government
2. Hospital operated by foreign government or international body (ex: United Nations)
3. Hospital operated by non-governmental organization/charity organization
4. Hospital (Unspecified)
5. Clinic operated by Liberian Government
6. Clinic operated by foreign government or international body (ex: United Nations)
7. Clinic operated by non-governmental organization/charity organization
8. Clinic (Unspecified)
9. Community Health Workers
10. Traditional Healer
11. Private Hospital

12. Midwife
13. Family Member
97. Other
98. Refused (vol.)
99. Don't Know (vol.)

Q-15c. **(Ask if not '9995' in Q-15a)** And is this facility/person located inside the community or outside the community?

1. Inside Village
2. Outside Village

____

98. Refused (vol.)
99. Don't Know (vol.)

Q-15d. And based on the transportation available to most people in this community, how many minutes would it take a normal person in this community to get to **<insert answer from Q-15a>** and come back? Please do not include the time to see the person or receive treatment.

____ ____ ____

9995. More than one day
9998. Refused (vol.)
9999. Don't Know (vol.)

Q-15e. And what other facility or person do people in this community typically visit for treatment when they are sick or injured? **(Multiple Mention, Record All Responses)**

1. Hospital operated by Liberian Government
2. Hospital operated by foreign government or international body (ex: United Nations)
3. Hospital operated by non-governmental organization/charity organization
4. Hospital (Unspecified)
5. Clinic operated by Liberian Government
6. Clinic operated by foreign government or international body (ex: United Nations)
7. Clinic operated by non-governmental organization/charity organization
8. Clinic (Unspecified)
9. Community Health Workers
10. Traditional Healer
11. Private Hospital
12. Midwife

13. Family Member

_____

95. No Other Facility Available
97. Other
98. Refused (vol.)
99. Don't Know (vol.)

Q-16a. When a woman in this community must give birth, what is the name of the primary facility that she will go to assist in delivery? If it is not a facility, what is the name of the caregiver?

_____

9995. No Facility available
9999. Refused/Don't Know

Q-16b. And what kind of facility or person is this?

1. Hospital operated by Liberian Government
2. Hospital operated by foreign government or international body (ex: United Nations)
3. Hospital operated by non-governmental organization/charity organization
4. Hospital (Unspecified)
5. Clinic operated by Liberian Government
6. Clinic operated by foreign government or international body (ex: United Nations)
7. Clinic operated by non-governmental organization/charity organization
8. Clinic (Unspecified)
9. Community Health Workers
10. Traditional Healer
11. Private Hospital
12. Midwife
13. Family Member

_____
97. Other
98. Refused (vol.)
99. Don't Know (vol.)

Q-16c. And is this facility/person located inside the community or outside the community?

1. Inside Village
2. Outside Village

____

98. Refused (vol.)
99. Don't Know (vol.)

Q-16d. And based on the transportation available to most women in this community, how many minutes would it take a normal woman in this community to get to **<insert answer from Q-16a>** and come back? Please do not include the time to see the person or receive treatment.

____ ____ ____ ____

9995. More than one day to walk there and back
9998. Refused (vol.)
9999. Don't Know (vol.)

Q-16e. What other facility or person do women go to when giving birth? **(Multiple Mention, Record All That Apply)**

1. Hospital operated by Liberian Government
2. Hospital operated by foreign government or international body (ex: United Nations)
3. Hospital operated by non-governmental organization/charity organization
4. Hospital (Unspecified)
5. Clinic operated by Liberian Government
6. Clinic operated by foreign government or international body (ex: United Nations)
7. Clinic operated by non-governmental organization/charity organization
8. Clinic (Unspecified)
9. Community Health Workers
10. Traditional Healer
11. Private Hospital
12. Midwife

13. Family Member

_____

95. No Other Facility
97. Other
98. Refused (vol.)
99. Don't Know (vol.)

Q-17. Since the start of the Ebola outbreak, are you aware of representatives or community health workers from any of the following organizations working in this community?

1. Liberian Ministry of Health
2. Red Cross
3. Community Health Worker (Unspecified)

_____

95. No Organizations Active in Community
97. Other: Specify
98. Refused
99. Don't Know

Q-18a. **(Ask if '1' in Q-17)** And how many representatives from the Liberian Government/Ministry of Health have been active in this community since the Ebola outbreak?

_____ _____

998. Refused (vol.)
999. Don't Know (vol.)

Q-18b. **(Ask if '1' in Q-17)** And when was the last time representatives from Liberian Government/Ministry of Health were active in this community?

1. Within Last Month
2. With Last Six Months
3. Within the Last Year
4. With the Last Two Years

_____

98. Refused (vol.)
99. Don't Know (vol.)

Q-19a. **(Ask if '2' in Q-17)** And how many representatives from the Red Cross have been active in this community since the Ebola outbreak?

_____ _____

998. Refused (vol.)
999. Don't Know (vol.)

Q-19b. **(Ask if '2' in Q-17)** And when was the last time representatives from the Red Cross were active in this community?

1. Within Last Month
2. With Last Six Months
3. Within the Last Year
4. With the Last Two Years

_____
98. Refused (vol.)
99. Don't Know (vol.)

Q-20a. **(Ask if '3' in Q-17)** And how many community health workers **(Unspecified)** have been active in this community since the Ebola outbreak?

_____ _____
998. Refused (vol.)
999. Don't Know (vol.)

Q-20b. **(Ask if '3' in Q-17)** And when was the last time community health workers **(Unspecified)** were active in this community?
1. Within Last Month
2. With Last Six Months
3. Within the Last Year
4. With the Last Two Years

_____
98. Refused (vol.)
99. Don't Know (vol.)

Q-21a. **(Ask if '97' in Q-17)** And how many representatives from **(Insert Other Response)** have been active in this community since the Ebola outbreak?

_____ _____
998. Refused (vol.)
999. Don't Know (vol.)

Q-21b. **(Ask if '97' in Q-17)** And when was the last time representatives from **(Insert Other Response)** were active in this community?

1. Within Last Month
2. With Last Six Months
3. Within the Last Year
4. With the Last Two Years

_____
98. Refused (vol.)

99. Don't Know (vol.)

Section 6: Other Infrastructure

Q-22. What type of educational facilities are located within this community? **(Multiple Response)**

1. No School Located in this Community
2. Primary School
3. Secondary School
4. Vocational School
5. University
6. Post-graduate University

_____

98. Refused
99. Don't Know

Q-23. What is the name of the primary market where people in this community go to buy and sell food and other goods?

_____

9998. Refused
9999. Don't Know

Q-24. And is (insert name of market) in this community or outside the community?

1. Inside Community
2. Outside Community

_____

98. Refused (vol.)
99. Don't Know (vol.)

Q-25. **(Ask if '2' in Q-24)** And what community is (insert name of market) in?

_____

9998. Refused
9999. Don't Know

Q-26. And what type of food and other goods are bought and sold at (insert name of market)? **(Multiple Mention)**

1. Meat
2. Poultry
3. Fish
4. Fruit
5. Vegetables

_____

97. Other: _____

98. Refused
99. Don't Know

Q-27. And what day(s) of the week is (insert name of market) open?

1. Monday
2. Tuesday
3. Wednesday
4. Thursday
5. Friday
6. Saturday
7. Sunday

_____

95. Every Day
98. Refused
99. Don't Know

Q-28. And about how many stalls or vendors are selling food and other goods at (insert name of market)?

___ ___ ___ ___

9998. Refused
9999. Don't Know

Q-29. Is there a place of worship in this community?

1. Yes
2. No

_____

98. Refused
99. Don't Know

Q-30. **(Ask if 'No' in Q-29)** And what is the name of the community where people go to worship?

_____

9995. People do not worship anywhere
9998. Refused
9999. Don't Know

Closing Statement:
Thank you for your time today. My supervisor may call you back in the coming weeks to confirm my work but I again want to ensure that your name will remain confidential. Your participation is greatly appreciated by the Red Cross. Do you have any questions for me?

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List of Detailed Mapping Communities

Count	Country	Name	Latitude (Y)	Longitude (X)
1	Guinea	Balancia	10.188	-11.842
2	Guinea	Bofossou	8.662	-9.696
3	Guinea	Mongo centre	8.612	-10.256
4	Guinea	Layah	9.446	-12.716
5	Guinea	lola_ctre	7.834	-8.589
6	Guinea	Kobikoro	9.212	-10.545
7	Guinea	Yomadou doukono	8.948	-10.467
8	Guinea	Gombokhory	9.721	-12.794
9	Guinea	Kafou tanene	9.340	-12.859
10	Guinea	macenta_ctre	8.545	-9.472
11	Guinea	Sikhourou	9.615	-12.809
12	Guinea	Dalonya	9.663	-12.829
13	Guinea	KolÃ©da	8.645	-10.419
14	Guinea	Teldou	8.526	-10.235
15	Guinea	Sitakoto	10.049	-11.700
16	Guinea	Diomandou	8.455	-9.587
17	Guinea	Koyamah	7.819	-9.375
18	Guinea	Nkrumah	8.509	-10.328
19	Guinea	YÃ©gbadou	8.554	-10.578
20	Guinea	Songhoyah marchÃ©	9.725	-10.877
21	Guinea	Tassen Center	9.366	-12.759
22	Guinea	Ouro	7.849	-9.106
23	Guinea	Soopa centre	7.256	-9.058
24	Guinea	Secteur 1	7.679	-8.316
25	Guinea	District Bangueta	7.776	-8.677
26	Guinea	Bounouma Centre	7.641	-8.800
27	Guinea	DÃ©mou 2	7.815	-8.646
28	Guinea	Districts konigna Aviasson	7.801	-8.699
29	Guinea	Wouet 2	8.487	-10.406
30	Guinea	Bamakama centre	7.716	-9.269
31	Guinea	Oueya centre	7.728	-9.210
32	Guinea	Kpao Centre	7.541	-8.773
33	Guinea	Koyamah	7.858	-9.283
34	Guinea	Faranah	10.042	-10.740
35	Guinea	Forecariah	9.430	-13.083
36	Guinea	Gueckadou	8.561	-10.131
37	Guinea	Kissidougou	9.192	-10.097
39	Guinea	Mamou	10.374	-12.083

40	Guinea	N'Zerekore	7.758	-8.817
41	Guinea	Dieke	7.347	-8.955
42	Liberia	Belefanai	7.262	-9.436
43	Liberia	Bellemu	7.196	-9.209
44	Liberia	Gahnmue	7.233	-9.165
45	Liberia	Sanniquellie	7.363	-8.707
46	Liberia	Ganta	7.234	-8.986
47	Liberia	Yekepa	7.575	-8.541
48	Liberia	Jenne Wonde Community	7.076	-11.269
49	Liberia	Bamballa	7.221	-11.176
50	Liberia	Bo Waterside Community	7.012	-11.371
51	Liberia	Tienii Community	6.968	-11.312
52	Liberia	Mambo town	6.999	-11.293
53	Liberia	Johns Town	8.197	-9.726
54	Liberia	Salayea Town	7.616	-9.493
55	Liberia	Kpaiyea Town	7.716	-9.386
56	Liberia	Fissabu	7.821	-9.467
57	Liberia	Yarpuah Town	7.656	-9.425
58	Liberia	Borkeza Town	7.910	-9.458
59	Liberia	Konia Town	7.961	-9.540
60	Liberia	Voinjama	8.423	-9.753
61	Liberia	Zorzor	7.776	-9.428
62	Liberia	Kiantahun town	8.164	-10.215
63	Liberia	Bolahun town	8.232	-10.160
64	Liberia	Popalahun town	8.177	-10.229
65	Liberia	Foya	8.360	-10.209
66	Liberia	Vahun	8.062	-10.505
67	Liberia	Kumgbor	7.646	-10.576
68	Sierra Leone	Jojoima.	7.878	-10.790
69	Sierra Leone	Kailahun town	8.278	-10.574
70	Sierra Leone	Gandorhun	8.435	-10.866
71	Sierra Leone	Manjama	8.602	-10.697
72	Sierra Leone	Kombayedeh	8.786	-10.709
73	Sierra Leone	Gbentu	9.941	-11.644
74	Sierra Leone	Kukuna	9.395	-12.666
75	Sierra Leone	Buedu town	8.281	-10.370
77	Sierra Leone	Gbongongor	8.891	-10.637
78	Sierra Leone	Manosewallu town	8.334	-10.492
79	Sierra Leone	Gofor	7.246	-11.360

80	Sierra Leone	Koindu town	8.462	-10.337
81	Sierra Leone	Fintonia	9.675	-12.224
82	Sierra Leone	Nyandehun Mabaibu	8.203	-10.481
83	Sierra Leone	Manowa	8.174	-10.748
84	Sierra Leone	Konobendu village	8.414	-10.719
85	Sierra Leone	Masofinia	9.080	-11.034
86	Sierra Leone	Sandaru town	8.395	-10.706
87	Sierra Leone	Bandapirie	8.940	-10.737
88	Sierra Leone	Mandopolahun	8.211	-10.316
89	Sierra Leone	Koima village	8.845	-10.776
90	Sierra Leone	Mobai	7.994	-10.754
91	Sierra Leone	Bindi	9.915	-11.446
92	Sierra Leone	Seria	9.465	-10.924
93	Sierra Leone	Kamaron	9.345	-10.871
94	Sierra Leone	Pendembu	8.099	-10.695
95	Sierra Leone	Kambia	9.124	-12.918
96	Sierra Leone	Mamudia	9.799	-11.659
97	Sierra Leone	Rosinoh	8.973	-12.997
98	Sierra Leone	Barukuya	9.457	-12.638
99	Sierra Leone	Faama	7.526	-10.998
100	Sierra Leone	Jendema	7.019	-11.382
101	Sierra Leone	Gbamandu	8.641	-10.668
102	Sierra Leone	Densambadu	8.659	-10.526
103	Sierra Leone	Masadukura	9.367	-10.740
104	Sierra Leone	Mongo	9.531	-10.957