

# The Socio-Economic Impacts of Ebola in Liberia

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*Results from a High Frequency Cell Phone Survey*

*Round 3*

*January 12, 2015*



**WORLD BANK GROUP**

**GALLUP®**

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## Overview

As of January 4, 2015 Liberia has reported over 8,000 cases of Ebola Virus Disease (EVD), and nearly 3,500 deaths. In recent weeks, however, the crisis has shown signs of being brought under control, with daily confirmed cases down from twenty-five in November 2014 to ten in early December 2014. In addition, a number of health and travel restrictions have been lifted, and most closed markets reopened.

The World Bank Group, with the Liberia Institute of Statistics and Geo-Information Services and the Gallup Organization, has continued to monitor the socio-economic impacts of EVD on households through a series of mobile-phone surveys conducted in October, November, and December 2014. Though the crisis has abated to some degree in Liberia, the negative impacts of EVD remain evident across all sectors of employment, as well as in the agricultural sector and on food security.

**Even with improvements in the health situation, the economy continues to shed jobs faster than they are replaced.** Nearly half of Liberian household heads remain out of work despite response-related jobs being created in the construction and health fields. The job losses seen in the most recent round of data collection were predominantly among wage workers in urban areas. As most public sector workers have not been working since the crisis began, the new losses come from the private and non-governmental sectors. And while public sector employees are still receiving salaries, the newly unemployed represent lost income for households. Women are particularly vulnerable as the labor market stagnates, since they work disproportionately in hard-hit non-farm self-employment sector. Of those working at the baseline, by December, 60 percent of the women surveyed were not currently working, compared with 40 percent of men; and, across all three rounds, women were consistently more likely to be out of work compared with men.

**In the agricultural sector, there are new concerns about farmers' ability to organize work teams given Ebola fears, reducing harvests.** Among the households surveyed that had finished their harvest, over 80 percent reported that their harvest was smaller this year than last, and the main reason cited was an inability to work in groups due to the Ebola virus. This was also the main reason cited by those with crops still in the field as to why the harvest had not been completed. With the large pool of unemployed, it is not clear if the shortages are greater this year than in years past, and if they are caused by mobility difficulties, fear of infection, or other unknown reasons.

**As in the previous rounds of data collection, food insecurity persists across the country and households continue to lack the money needed to purchase rice, regardless of price.** About three-quarters of households indicated that they were worried at some point in the previous week that they would not have enough to eat. Around two-thirds of households responded that they were not able to purchase enough rice to meet their needs in the previous two weeks, and nearly 80 percent of those cited a lack of money as the main reason.

**Households across Liberia have undertaken various mechanisms to cope with Ebola’s socio-economic effects.** Eighty percent of those surveyed had either sold assets, sold or slaughtered livestock, borrowed money, sent their children to live elsewhere, spent savings, or delayed investments since the start of the Ebola crisis— all of which can have negative long-term effects on their welfare. Those in the south-easternmost counties, historically the poorest region of the country, were the most likely to undertake these coping strategies, even though they are among the least directly affected by EVD.

Data collection will continue monthly for the foreseeable future, to continue a timely and robust monitoring of how Ebola is affecting the Liberian economy and Liberian households in particular. As in the previous rounds, it is clear that EVD has extensive impacts, and that relief efforts need to look at not just the most affected areas, but also the poorest and most vulnerable for whom the economic side effects of the disease may have the most far-reaching consequences.

# Map

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## Objective

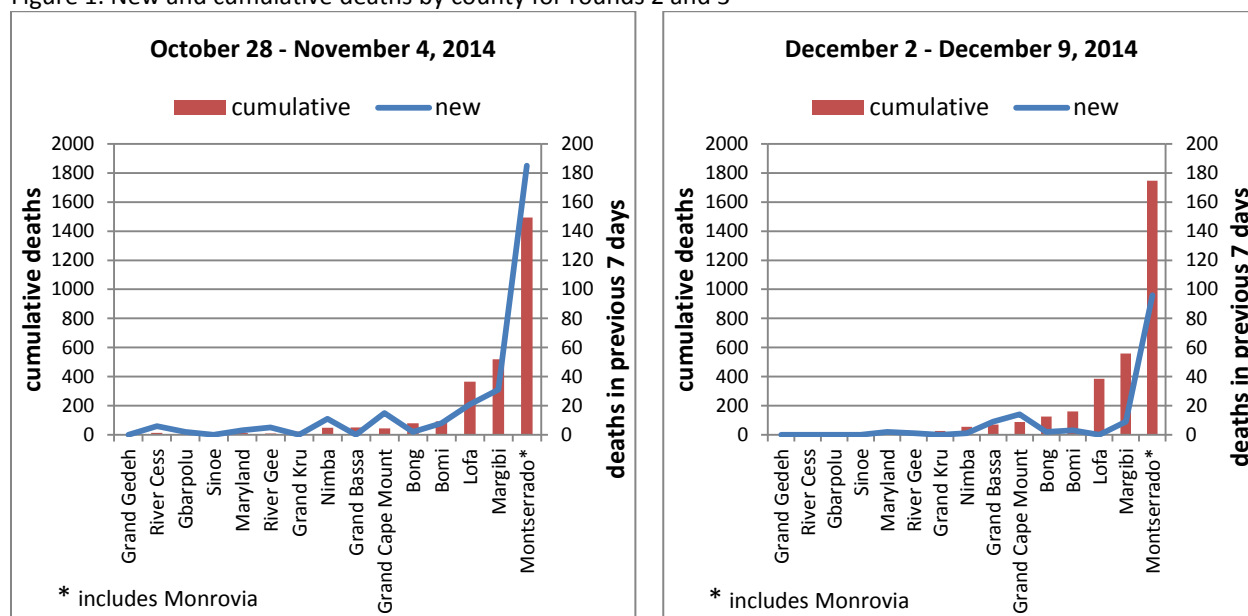
The Economic Impact of Ebola survey is a high frequency cell phone survey designed to monitor the socio-economic impacts of the ongoing Ebola crisis in Liberia. The survey has been conducted in three rounds from October to December 2014. The sample is based on the nationally representative Household Income and Expenditure Survey (HIES) implemented from February to August 2014 by the Liberia Institute of Statistics and Geo-Information Services (LISGIS). This effort was designed to provide rapid indicators of well-being from households across the country at a time when conducting a traditional face-to-face survey is extremely challenging. The survey was conducted by phone, and attempted to contact all households that participated in the HIES and for which cell phone numbers were recorded. As in the previous two rounds, low response rates hinder the representativeness of the survey.

The report begins with an update of the situation in Liberia with regards to the Ebola Virus Disease (EVD) crisis and response at the time of the third round of data collection (December 2 – 8, 2014). This is followed by updates on employment, prices, food security, and migration. This report is meant as a stand-alone document based on the round 3 data, but further context and methodological information on data collection and weight calculations can be found in the [previous report covering rounds 1 and 2](#).

## Background

**The EVD health crisis continued to abate through November and early December with new infections gradually slowing, prompting a lifting of some of the health restrictions which had been in place.** By early December, around ten new cases were being confirmed each day, compared with around 25 confirmed new cases daily in early November, when the previous survey round was conducted, and peaks approaching 100 in mid-September. As shown in figure 1, the total number of deaths per week has also declined substantially. Montserrado county, which contains the capital Monrovia, has seen the number of new deaths almost halved compared to the previous round, though there have been spikes in infection in some areas which had previously been thought to be under control. In addition, the President modified the state of emergency restrictions on November 13, reducing curfew hours, reopening most closed markets, and relaxing some domestic travel restrictions. Most government employees have not yet returned to work, however, and schools remain closed.

Figure 1. New and cumulative deaths by county for rounds 2 and 3



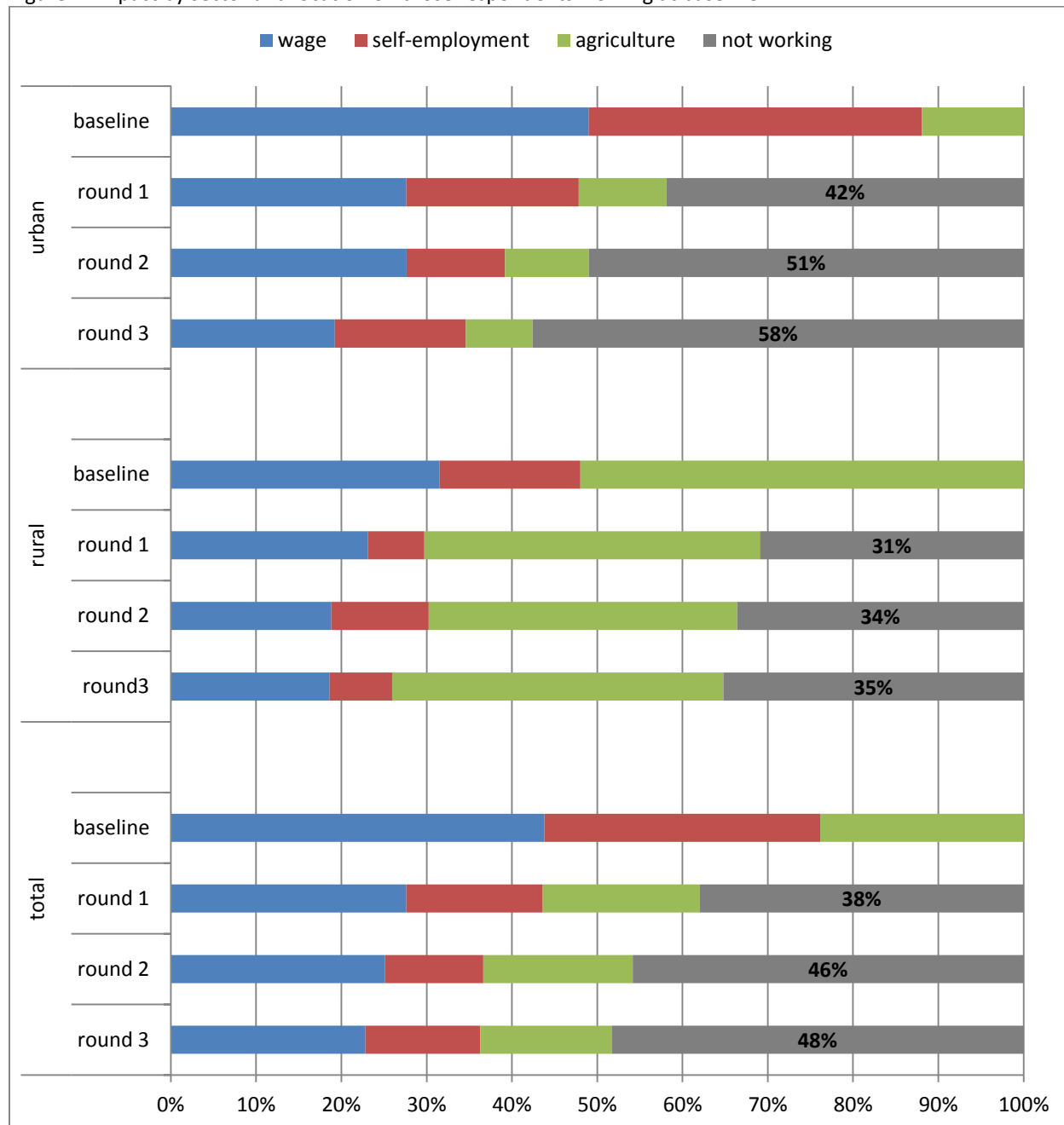
Source: Humanitarian data exchange (accessed December 21, 2014)

## Employment

**Despite the improving health situation and increased humanitarian assistance, there has not been a rebound in employment.** Overall there was a small increase in the percentage of household heads that are not currently working, which is mainly concentrated in wage employment in urban areas, although the change is not statistically significant. Neither wage nor non-agricultural self-employment has increased as a result of the normalizing health situation. Since public sector workers have not been working in all three rounds, the declines in the urban wage sector indicate that the private sector continues to shed jobs. See figure 2 on the following page for further detail.

**About 20 percent of total wage workers are in the public sector and therefore continue to receive their salary.** Since public sector workers continue to be paid, the welfare impacts of the loss of wage employment are smaller than implied by the decline in employment. According to the HIES baseline data, approximately 20 percent of wage workers are in the public sector. More than half of wage employees work in the private sector, and the remaining quarter work for NGOs, cooperatives, religious organizations, international organizations, and political parties; these workers are unlikely to be still receiving a salary if not currently working. Also, those wage workers outside the public sector may have seen decreases in the number of hours worked or salary received, which would have a negative impact on household income even for those that continue to work.

Figure 2. Impact by sector and location on those respondents working at baseline



Source : Results from HIES baseline survey (January – August 2014) and three rounds of high frequency phone survey (October – December 2014)

Note: Approximately five percent of respondents have switched sectors between baseline and round 3. Due to the method used to present the above findings, it is difficult to show these changes on the graph and therefore those that have switched are presented as still part of their original sector. Because the high frequency survey attempts to contact all potential respondents in every round of the survey, the composition of respondents varies in each round. To compare estimates across rounds, the share of the original baseline population that is working at the time of each round is estimated for each sector. This percentage is then applied to the baseline share of that sector. For example, 60 percent (weighted) of baseline wage workers were still working by round 1. Wage workers represented 44 percent (weighted) of all workers at baseline. Therefore, 26 percent is reported as the share of baseline workers who are wage workers in Round 1.

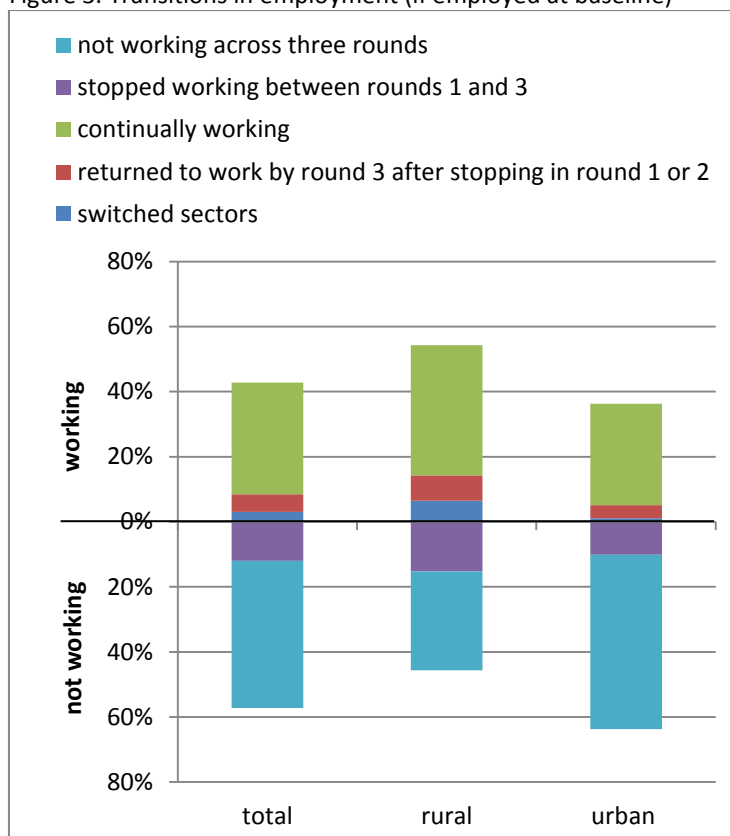


**The main constraints for the non-agriculture self-employed appear to have changed since earlier rounds.** Since only respondents that are newly not working in a specific round are asked why they are no longer working, the sample size is limited for this analysis and therefore should be interpreted with caution. In the first round, about half of those who were no longer working in self-employment cited closure of their usual place of business as the primary reason, with the second most cited reason being travel restrictions. In the second round, nearly all respondents who had recently stopped their self-employment activities cited the closure of the usual place of business. By the third round, the most common reasons are a lack of operating capital and a lack of customers. Also in round 3, those self-employed who were still operating their businesses were asked about the main challenge to improving this business. The two most common responses were again a lack of capital and few customers.

This finding raises concerns that many of the self-employed may have been forced to use their working capital for consumption during the period when markets were closed. Now, as the situation begins to normalize, they lack the resources to restart their business, and may also be hesitant to do so until they perceive a rebound in demand. Even for those still operating their business, a lack of working capital to return to previous levels of operation and a lack of customers due to the general economic contraction would lower incomes and negatively impact household welfare. In contrast, for those involved in wage employment, there has been no change over the three rounds. The main reason for not working has consistently been that the business or government office was closed.

**Outside of Monrovia, the county-level impact on employment is not correlated with the number of infections.** While the most substantial employment impacts and largest number of infections were in Montserrado county, which contains the capital of Monrovia, the correlation between the number of infections and the employment impacts in the remainder of the country is low and not statistically significant. While some individual counties showed statistically significant higher or lower probabilities of employment, these differences did not vary systematically by geography or number of EVD cases.

Figure 3. Transitions in employment (if employed at baseline)



Source: High frequency cell phone survey (October – December 2014)

**The economy has shed jobs faster than they can be replaced.** With the continuing expansion of the aid response, the economy has added jobs in recent weeks mainly in the construction and health fields. These jobs, however, have not been sufficient to offset the overall decline due to the general economic slowdown. Figure 3 shows the employment transitions between the baseline and round 3. Most job losses were recorded between the baseline and the first round. As the baseline was conducted over a number of months, it is difficult to separate the seasonal effects from job losses occurring since the start of the EVD crisis. Between rounds 1 and 3, however, there were further net job losses in a period which corresponds to the harvest / post-harvest months when employment usually rises. A small percentage of workers switched sectors by the third round. The changes shown in the graph correspond to only four observations in the dataset, for which two switched from paid employment to non-agricultural self-farm, one from non-farm self-employment to agriculture, and one from agriculture to non-farm self-employment.

**Women are particularly vulnerable to employment loss as they are disproportionately working in non-farm self-employment.** In round 3 of the cell phone survey, 60 percent of women were not currently working, compared with 40 percent of men. In the panel component of the sample, about 10 percent of women reported working in all three rounds, compared with more than 40 percent of men, and more than half of women have not been working in all three rounds. Prior to the EVD crisis, self-employment was dominated by women, with 63 percent of working women generally, and 42 percent of working female household heads, employed in this sector. This placed women in employment that has been more vulnerable to the economic impact of the crisis.

## Agriculture

**The latest survey suggests increased concern for the agricultural sector due to shortages of available labor.** Although the number of observations for rural areas is limited due to low response rates, round 3 data shows that of the just over half of agricultural households that indicate the main harvest of food crops has been completed, more than 80 percent reported a smaller harvest this year than last. Though a diverse set of reasons were cited, the most frequent reason was the inability to work in groups because of the Ebola virus. Similarly, for those with crops still in the field, the main reason cited for the harvest not being completed was the inability to work in groups. These findings point to difficulties in accessing the necessary labor for agricultural activities despite the recent substantial losses in employment nationally. Because no comparable baseline exists, it is not clear how much of the shortage is due to mobility difficulties, fear of infection, or other reasons, or how much of the shortage would have existed even in the absence of EVD.

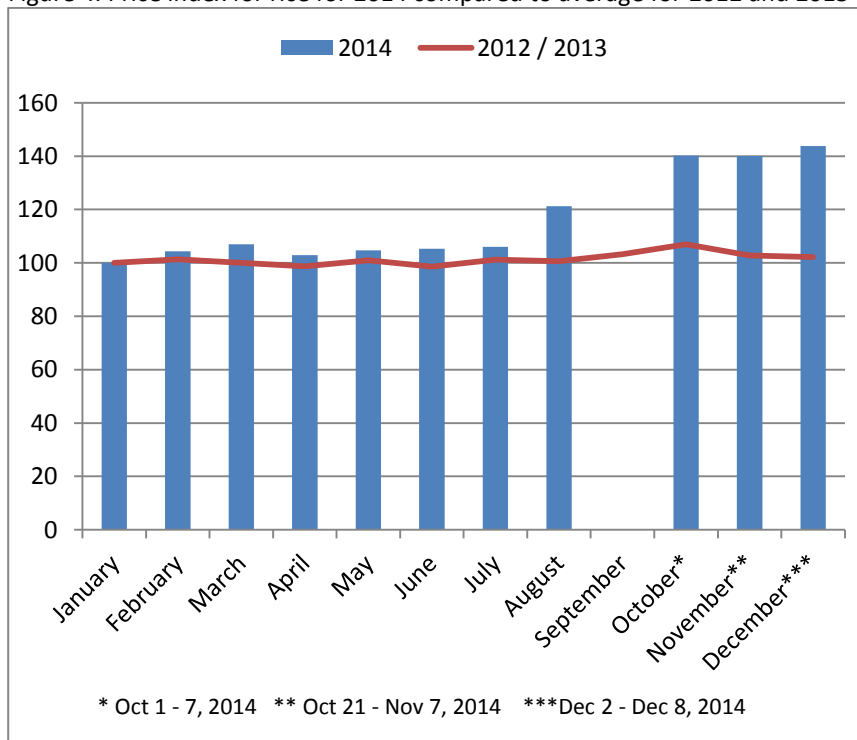
**Cash crops, in particular rubber cultivation, may also have been affected.** Rubber is a continuously harvested cash crop and an important source of household income, and more than half of the agricultural households indicated that they cultivated rubber in the previous year. Of these households, however, just over half indicated that they have been able to harvest rubber since the start of the Ebola crisis, though substantial recent declines in rubber prices have likely also contributed to the reduction. Similarly to rubber, about half of agricultural households indicated that they cultivated cocoa in the previous year. Of these, about three-quarters have harvested cocoa this year, though the harvest

period is still ongoing. It should be noted that these conclusions are based on an extremely small sample size, about 65 observations for each rubber and cocoa, and should therefore be interpreted with considerable caution.

## Prices

**Rice prices remain above the seasonal average.** The limited historical data available indicates that there is usually a decline in prices beginning in November with the harvest to a low in January. Prices in 2014, however, have remained elevated into December, despite an eight-percent appreciation in the exchange rate since May 15, 2014, which would be expected to decrease the cost for imported rice. The overall price increase remains about 40 percent over the January baseline. The delayed end to the annual rains and labor shortages noted above have postponed the completion of the harvest in some areas, which will likely decrease prices in the coming weeks, as will the continued distribution of food aid. Future rounds of the survey will continue to monitor prices. Figure 4 shows the estimated price change by month for a 50 kg bag of rice from a January baseline in 2014 as well as the combined average for 2012 and 2013.<sup>1</sup>

Figure 4. Price index for rice for 2014 compared to average for 2012 and 2013



Source: 2014 HIES, high frequency phone survey, WFP VAM

<sup>1</sup> In the HIES the question refers specifically to imported rice while in the first two rounds of high frequency phone survey, the question was more general. The third round questionnaire now specifically refers to imported rice. As local rice is generally less expensive than imported rice any bias in the measure would understate levels in October and November. This impact, however, is likely to be small due to the large percentage (estimated by FAO to be up to 80 percent) of Liberia rice which is imported.

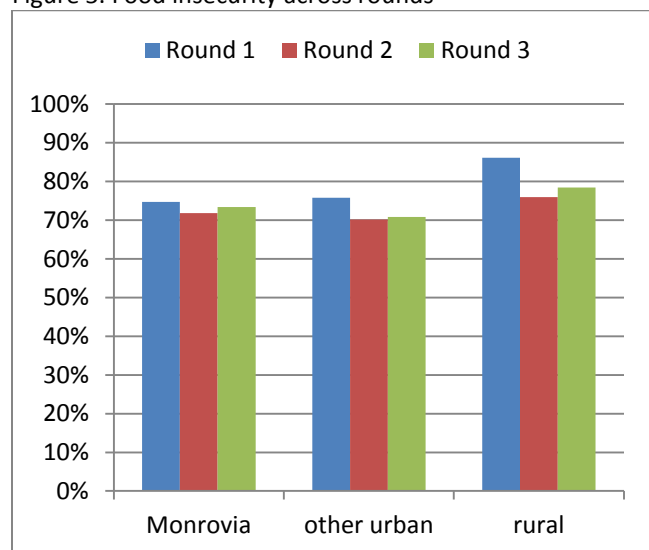
**A lack of money, rather than availability or high prices, continues to be the main problem with meeting rice needs.** As in rounds 1 and 2, about 65 percent of households in round 3 indicated that they were not able to purchase enough rice to meet their needs as some point in the previous two weeks. The main reason continues also to be that the household did not have enough money, rather than the price being too high or rice being unavailable. This indicates that households believe it is a lack of income rather than the high prices contributing to food insecurity, and that a decline in prices without a rebound in employment may not alleviate the problem. The percentage citing a lack of money has increased from 66 percent in round 1 to 76 percent in round 2 to 80 percent in round 3, a statistically significant difference between the first and third rounds.

## Food Security

### **Evidence of widespread food insecurity persists.**

Nationally, about three-quarters of households indicated that they were worried at some point in the last week that they would not have enough to eat, with small differences across Monrovia, other urban areas, and rural areas. Between rounds 1 and 2, there was statistically significant drop in insecurity in rural areas, which corresponded with the start of the harvest in northern and eastern parts of the country. This trend, however, did not continue into the third round and overall levels of food insecurity remain high. Among the households present in all three rounds, 96 percent cited food insecurity in at least one of the rounds. About half expressed these concerns in all three rounds. A number of factors likely contribute to food insecurity, including a loss of household income, high prices for rice, transportation issues, and border closures, but it is not possible from these data to assess their relative contributions to the overall total.

Figure 5. Food insecurity across rounds



Source: Cross sectional estimates from cell phone survey

However, there is no correlation between county-level food insecurity and incidence of EVD. There is no correlation between the total number of deaths in a county and the incidence of food insecurity. This is consistent with the earlier finding on employment that the negative effects of EVD are national. Specifically with regard to food security, it is likely that feeding centers established in conjunction with treatment units have offset some of the negative impacts in highly-affected areas.

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**Coping strategies for food insecurity have not changed between rounds.** Among those households with food security concerns, generally there have not been any significant changes in the frequency or type of coping strategies employed over rounds, with the exception of a significant reduction in the

number of days in the previous week that households have had to reduce the number of meals eaten in a day. See table 1 for further details.

Table 1. Coping strategies for food insecurity

	In the past 7 days, how many days have you or someone in your household had to...				
	...rely on less preferred and/or less expensive foods?	...limit portion size at meal-times?	...reduce number of meals eaten in a day?	... restrict consumption by adults in order for small children to eat?	... borrow food, or rely on help from a friend or relative?
Round 1	2.9	3.0	3.4	3.3	2.1
Round 2	2.6	3.1	2.6	2.8	2.3
Round 3	2.7	2.9	2.3	3.1	2.2

Source: Cross sectional estimates from high frequency phone survey (October – December 2014)

**Other widespread economic coping strategies could harm long-term household well-being.** If households are forced to sell or consume productive assets, they are less likely to be able maintain or improve their welfare levels in the future. Eighty percent of respondents indicated having taken one or more of the following actions since the Ebola crisis began: sell assets, such as tools, furniture, machines, jewelry, etc.; sell or slaughter livestock; borrow money from others; send children to live with other relatives; spend savings; delay investments. The most common were borrowing money, spending savings, and delaying investments, which approximately 40 percent of respondents indicating each since the start of the EVD crisis. The need to undertake these strategies did not vary over urban and rural areas, though residents of the south-easternmost counties (Grand Kru, River Gee, and Maryland) were more likely to do so. These counties have been among the least directly affected by EVD, but are historically among the poorest areas of the country. Since there is no other comparable data for non-crisis years, it is not possible to investigate if these coping strategies are regular necessities or driven by the EVD crisis.

## Migration

**Migration has been increasing.** In round 1, approximately seven percent of households indicated that a regular household member had left the household. By the second and third rounds, the percentages were 13 percent and 18 percent, respectively. In all three rounds, migrants were most likely to remain within their original county, with the second more common destination being Monrovia. In addition, the third round included a question about returning household members. The source for returnees mirrored the destination for departures. This lack of systematic movement from one area to another, from highly-affected to less-affected areas for example, indicates the migration is likely more similar to standard migration patterns than related to the EVD crisis, with an magnitude accompanying the reduction in travel restrictions.

## Conclusion

There have been reductions in the infection rate for Ebola Virus Disease in Liberia, and an accompanying lessening of some restrictions related to economic activity. The employment situation, however, has been slow to rebound. Though the overall number of Liberians not working has not substantially changed since November 2014, there has been a further contraction of the non-governmental wage sector in urban areas. This is significant because unlike the public sector, the newly unemployed are unlikely to continue to be paid. Also, while the non-farm self-employment sector has not seen further losses in terms of jobs, the main constraints have shifted from closed markets and travel restrictions to a lack of customers and operating capital. Female-headed households have been negatively impacted as they are disproportionately involved in self-employment activities. New evidence also suggests possible issues in the agricultural sector, particularly in relation to the labor needed to harvest food crops. There are also some initial indications of declines in rubber harvesting, an important cash crop for many households. Across all three main sectors of employment, the crisis continues to impact household incomes, through lost jobs or reduced hours in wage employment, closed or contracted businesses in self-employment, and loss of income from cash crops in agriculture.

High levels of reported food insecurity persist, despite the continuation of the harvest period. There has been no change in rural areas between rounds 2 and 3, following a modest improvement between rounds 1 and 2. Rice prices also remain elevated. Coping strategies for food insecurity have not changed between rounds, but new information on wider economic coping mechanisms have raised concerns about EVD's long term impact on households' ability to maintain or improve welfare. Eighty percent of respondents have reported either selling or consuming productive assets or delaying investments since the start of the EVD crisis. The incidence of these actions was highest in the southeast of the country, an area with low levels of Ebola infections but high poverty and vulnerability, though there is no comparable baseline data to estimate the impact of EVD compared to non-crisis years. Overall there is little evidence that the negative economic consequences of Ebola have been concentrated in highly-affected counties. Impacts on employment, food security, and prices are found across Liberia. This supports previous findings that the crisis has been national in scope and that many in need may be outside of the areas directly affected by Ebola.

## Response Rates and Non-Response Adjustment

For a full description of the survey methodology and the implementation, see the methodological annex of the first report.

Table A1. Number of respondents by round

round 1 only	round 2 only	round 3 only
144	21	190
round 1 & round 2	round 2 & round 3	round 1, 2, & 3
137	79	288

Table A2. Regional distribution of households

geography	round 1			round 2		round 3	
	% households (census)	% households survey (unweighted)	n	% households survey (unweighted)	n	% households survey (unweighted)	n
Bomi	3.1	4.0	26	4.7	22	5.4	31
Bong	10.4	6.3	41	5.5	26	8.1	47
Grand Bassa	7.1	6.2	40	5.5	26	6.9	40
Grand Cape Mount	3.6	3.9	25	3.0	14	2.8	16
Grand Gedeh	2.7	7.6	49	7.6	36	7.6	44
Grand Kru	1.3	2.6	17	2.1	10	2.6	15
Lofa	7.4	3.4	22	3.8	18	4.0	23
Margibi	6.7	8.6	56	8.1	38	7.4	43
Maryland	2.9	4.2	27	3.4	16	4.2	24
Montserrado	34.7	37.7	244	40.7	192	33.9	196
Nimba	12.0	3.9	25	5.7	27	5.2	30
River Cess	2.1	2.3	15	3.0	14	2.4	14
Sinoe	2.4	3.6	23	1.9	9	3.8	22
River Gee	1.5	2.6	17	2.8	13	2.3	13
Gbarpolu	2.2	3.2	21	2.3	11	3.5	20
Urban	56.2	71.5	463	74.2	350	69.2	400
Rural	43.8	28.6	185	25.9	122	30.8	178
Total	100.0	100.0	648	100.0	472	100.0	578

Table A3: Logit results for non-response adjustment

	round 3		panel	
	coef	se	coef	se
Respondent Characteristics				
female	-0.317**	0.128	-0.294*	0.168
age	0.001	0.023	0.020	0.031
age squared	0.000	0.000	-0.000	0.000
Sector of Employment (Reference : Wage)				
self-employment	-0.061	0.133	-0.315*	0.175
agriculture	-0.557***	0.150	-0.558***	0.212
unpaid family work	-0.070	0.429	-0.032	0.564
other	-0.089	0.192	0.133	0.228
Geographic Strata (Reference : Monrovia)				
Bomi Urban	-0.863*	0.475		
Bomi Rural	-0.553**	0.262	-0.565*	0.324
Bong Urban	0.194	0.260	-0.429	0.341
Bong Rural	-0.516	0.316	-0.641	0.412
Grand Bassa Urban	0.004	0.260	-0.453	0.329
Grand Bassa Rural	-1.146***	0.367	-1.755***	0.613
Grand Cape Mount Urban	-1.178*	0.646		
Grand Cape Mount Rural	-1.563***	0.317	-2.117***	0.529
Grand Gedeh Urban	-0.328	0.241	-0.125	0.274
Grand Gedeh Rural	-0.857**	0.334	-1.783***	0.609
Grand Kru Urban	-0.534	0.598	-0.744	0.773
Grand Kru Rural	-1.374***	0.319	-1.671***	0.479
Lofa Urban	-0.617*	0.338	-1.002**	0.490
Lofa Rural	-0.789**	0.380	-1.132**	0.554
Margibi Urban	-0.275	0.266	-0.314	0.314
Margibi Rural	-0.807***	0.300	-0.566*	0.343
Maryland Urban	-0.795***	0.265	-1.589***	0.439
Maryland Rural	-2.746***	0.731	-2.754***	1.021
Montserrado Urban	-0.100	0.468	-0.339	0.573
Montserrado Rural	0.834	0.542	0.720	0.547
Nimba Urban	-0.654**	0.277	-0.527	0.335
Nimba Rural	-0.734*	0.400	-2.459**	1.027
River Cess Urban	0.045	0.544	-0.742	0.774
River Cess Rural	-1.306***	0.337	-1.571***	0.490
Sinoe Urban	-0.671	0.422	-0.793	0.548
Sinoe Rural	-1.387***	0.311	-2.020***	0.530
River Gee Urban	-0.680*	0.351	-0.802*	0.456
River Gee Rural	-3.888***	1.013		
Gbarpolu Urban	-0.494	0.491	-1.046	0.753
Gbarpolu Rural	-0.914***	0.323	-1.920***	0.609
Constant	-0.303	0.532	-1.417**	0.695
N	2324		2198	
Pseudo R-squared	0.0845		0.094	

note: \*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1