

Liberia and Sierra Leone

May 2015: Coping improves significantly in Liberia and Sierra Leone

Tracking food security during the Ebola Virus Disease (EVD) outbreak

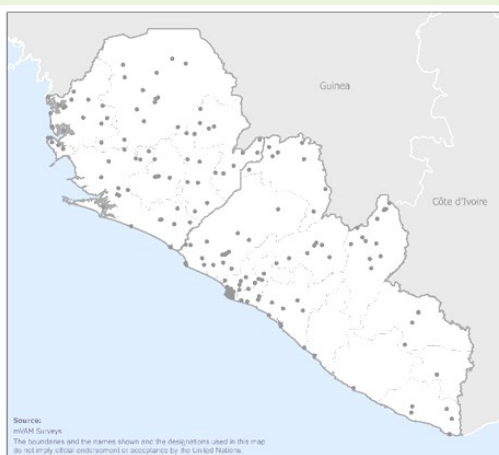
Highlights

- Liberia is officially Ebola-free, but the virus continues to spread in Sierra Leone.
- Consistent with past trends, Liberia and Sierra Leone saw statistically significant improvements in coping in May. Geographically, the biggest improvements are seen in Bong County, Liberia and in the districts of Kambia and Port Loko in Sierra Leone.
- Food prices in both countries were stable compared to the previous month. Wage rates remain stable in Liberia and increase slightly in Sierra Leone.
- Analysis of food security perceptions show a more positive trend in both countries in May compared to April 2015.

LIBERIA, SIERRA LEONE - Reduced Coping Strategies Index (rCSI)
MAY 2015



Source: WFP mVAM



Methodology

May 2015 marked the eighth round of data collection. The data was collected by SMS over one week in mid-May. A total of 1150 questionnaires were collected in Liberia, and 1020 were collected in Sierra Leone. The map below shows the cellphone towers from which responses were received. Details on methodology are available [online](#).

Liberia is Ebola-free, but the virus continues to spread in Sierra Leone

During the week to 17 May, Sierra Leone reported 8 confirmed cases of Ebola, the same total as in the previous week. Cases were reported from 3 districts: Kambia (1 case), Port Loko (3 cases) and the capital, Freetown (4 cases). The outbreak in Liberia was declared over on 9 May and the country has now entered a three-month period of heightened vigilance.

Source: [WHO Ebola Situation Report, 20 May 2015](#)

Consistent with past trends, Liberia and Sierra Leone saw significant improvements in coping in May

The reduced Coping Strategies Index (rCSI) measures the frequency and severity of the behaviours households engage in when faced with food shortages. A higher score indicates that households are resorting to more frequent or severe negative coping strategies.

Figure 1 shows that from April to May, the mean rCSI improved from 14.7 to 14.2 in Liberia. In Sierra Leone, the mean rCSI improved from 13.9 to 13.4. Amongst repeat respondents (those observed in both periods) in Liberia, there were statistically significant reductions in rCSI of 1.45 ($p<0.2$), while repeat respondents in Sierra Leone saw their scores drop by 1.84 ($p<0.01$). However, the median rCSI did not improve in May (12 for Liberia and 9 for Sierra Leone) indicating that gains were asymmetrically distributed amongst the population.

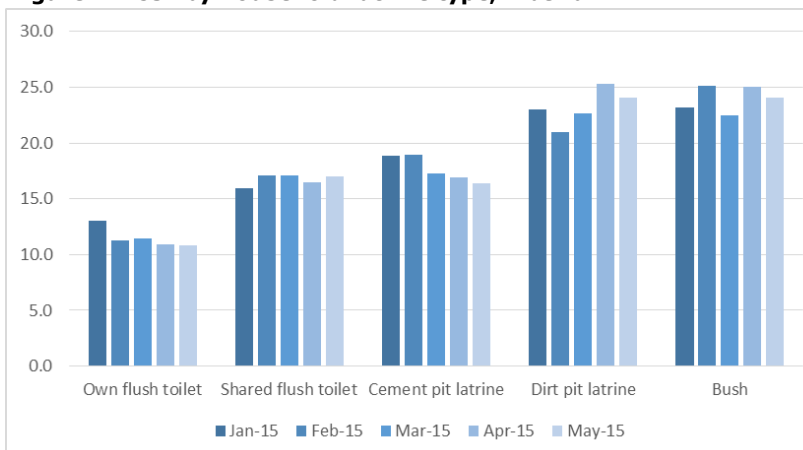
Geographically, the biggest improvements are seen in Bong County, Liberia and in the districts of Kambia and Port Loko in Sierra Leone. In Bong County, the mean rCSI improved from 15.5 to 13.8 and a definite net improvement is evident for 55 percent of the population. Amongst repeat respondents (73 out of 95 observations), the mean improvement was 1.6 points ($p<0.05$). For Kambia and Port Loko in Sierra Leone, there was a less dramatic decrease from 15.9 to 14.8, and a definite net improvement for 53 percent of the population. Amongst repeat respondents (89/136), the mean reduction was 2.3 points ($p<0.01$). Table 1 shows all statistically significant improvements ($p<0.05$) by district.

Table 1 : Statistically significant changes in rCSI for May 2015 by sample domain

Country	Governorate	Mean (May)	Mean (April)	Diff. Mean	Avg. Absolute Difference	P-Value (Wilcoxon)
Liberia		14.12	14.73	-0.61	-1.45	0.02
	Bong	13.80	15.53	-1.73	-1.60	0.05
	Southeast w/o Bassa	14.59	15.53	-0.94	-1.81	0.00
Sierra Leone		13.41	13.88	-0.47	-1.84	0.00
	Bombali, Koinadugu, Tonkolili	14.30	14.91	-0.60	-1.82	0.02
	Kambia, Port Loko	14.85	15.97	-1.13	-2.28	0.01
	Western Rural	12.66	12.77	-0.11	-2.59	0.01

Source: WFP mVAM

Figure 2: rCSI by household latrine type, Liberia



These improvements are seen in rural areas of Liberia and Sierra Leone, where the most vulnerable populations usually reside. This is further demonstrated by statistically significant improvements in rCSI for Liberian respondents with bush/dirt pit latrines (Figure 2). Their mean rCSI improved from 24.93 to 24.04; though amongst repeat respondents, the improvement was a modest 0.06 points on average ($p<0.06$). We also see improvements in prevalence amongst this group: there was a 3.8 percent decrease in coping prevalence from 96.25 percent to 92.49 percent ($p<0.03$)² in May.

Unfortunately, improvements are much more modest amongst poorer populations in Sierra

1. Wilcoxon Test
2. Chi-squared Test

Leone (Figure 3). Statistically significant differences are observed only amongst households with a cement pit or private flush toilet. For the former group, mean rCSI decreased from 14.19 to 14.03; more convincingly, amongst repeat respondents we see a mean drop of 1.8 points ($p<0.03$)¹. For households with a private flush toilet, the mean rCSI increased unexpectedly from 9.15 to 9.36. This is not significant and is surely due to outliers. Amongst repeated respondents we see a considerable decrease of 2.58 points ($p<0.04$)¹. Surprisingly, prevalence amongst repeat respondents for the cement pit latrine group showed a statistically significant increase from 76.65 percent to 77.43 percent ($p<0.05$)³. So although we see improvements overall, borderline food-secure households may be having difficulty in acquiring food. This applies only to Sierra Leone, as slight decreases in prevalence are observed amongst urban and wealthier sub-populations in Liberia.

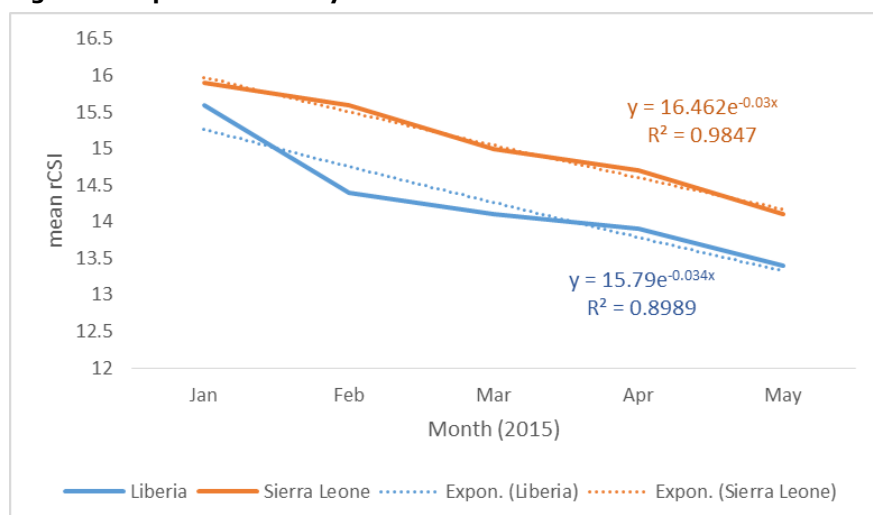
Circumstances improved for households headed by women and those headed by men in both countries. Households headed by women experienced the biggest improvement, supporting the notion that the recovery has arrived at the most vulnerable households. In Liberia, the average rCSI for repeat households headed by women improved by 2.88 points ($p<0.02$)¹. In Sierra Leone, this same group saw an improvement of 2.49 points ($p<0.01$)¹. For repeat households headed by men, the average rCSI improved by 1.24 points ($p<0.05$)¹ in Liberia and 1.73 points ($p<0.01$)¹ in Sierra Leone.

Panel data analysis shows continued improvements in coping

As far as possible, the same respondents were polled month after month. Our dataset contains at least four months of observations for 729 of 1988 unique respondents for Liberia (36.7%) and 654 of 1887 unique respondents for Sierra Leone (34.7%). Given the context, it was not feasible to attain repeat response rates of 100 percent, but the dataset was sufficient to perform longitudinal regression to isolate trends in time. The regression model controlled for dynamics arising from toilet type, fixed effects by district, and random effects of the respondents themselves, while rCSI was the dependent variable in the regression. The full specification of the mixed-effects panel data regression model is in the appendix, along with tables of the regression results.

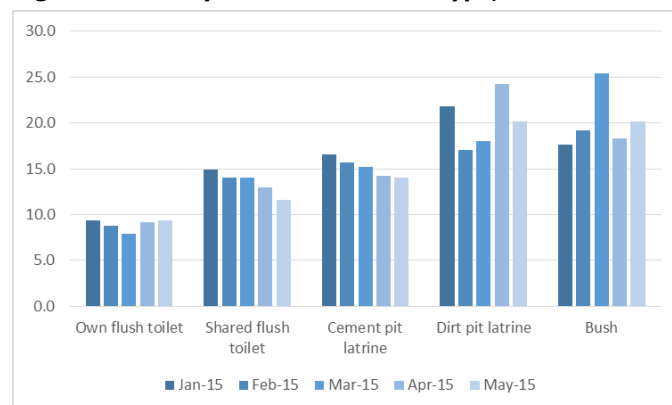
For Liberia, the fully specified model possessed an R^2 value of 0.76. That means it was able to explain 76 percent of the variance in rCSI – an acceptable result. The estimates showed that the average household has experienced a month-on-month improvement of 4.6 percent ($p<0.01$), but within a 95 percent confidence interval of 3.0 percent to 6.3 percent, starting from January. This corresponds to what we see from an exponential decay regression (this model yields the percentage change in time) on the overall average rCSI across each month. The result, depicted below, shows a 3.4 percent decrease month over month.

Figure 6: Exponential decay in mean rCSI for Liberia and Sierra Leone



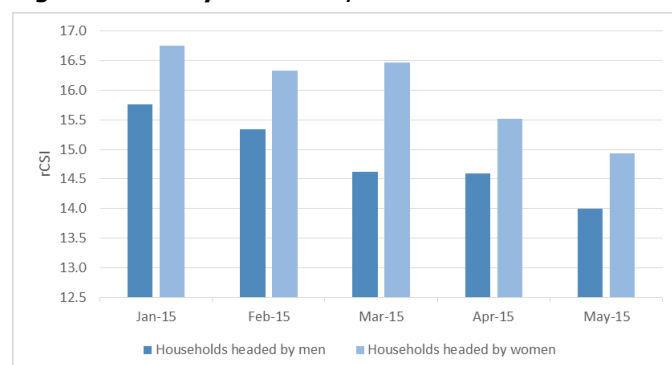
Source: WFP mVAM

Figure 3. rCSI by household latrine type, Sierra Leone



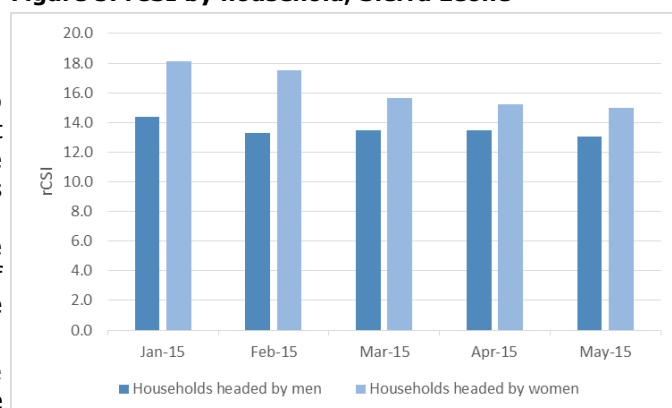
Source: WFP mVAM

Figure 4. rCSI by household, Liberia



Source: WFP mVAM

Figure 5. rCSI by household, Sierra Leone



Source: WFP mVAM

For Sierra Leone, the model offered a slightly better fit with an $R^2=0.79$ and it estimated an average household monthly improvement of 8.42 percent inside a 95 percent confidence interval of 6.69 percent to 10.14 percent. This is a very surprising result, for unlike Liberia, Sierra Leone has yet to entirely eliminate Ebola. Yet the results correspond directly to the abatement of Ebola in the country. This month saw a new low of just 30 new cases in the country across three districts. The result is almost double what one would expect from a simple regression upon the means, indicating a high degree of variability amongst respondents.

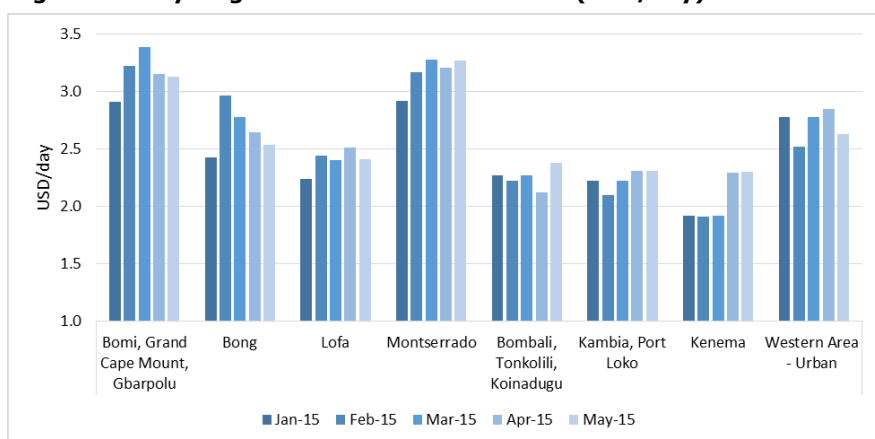
Food prices remain stable

In Liberia, local and imported rice prices remained stable or decreased in May in most districts, except in Montserrado, Lofa and Grand Cape Mount. In Montserrado, local rice prices rose by 5 percent, offsetting the decrease that took place in April. The price of palm oil rose in Bong (+6%), Grand Bassa (+4%) and Grand Kru (+3%). In the rest of the country, palm oil prices remained stable.

In Sierra Leone, the national average prices of rice – both local and imported – and palm oil showed mixed patterns in May. Imported rice prices increased in Kenema (+13%) and urban parts of Western Area (+7%). Local rice prices decreased or remained stable in most districts, except in rural parts of Western Area (+5%) and in Freetown (+3%). The price of palm oil decreased throughout the country, except in Kenema where prices remained stable.

Wage rates remain stable in Liberia and increase slightly in Sierra Leone

Figure 7: Daily wage rates for unskilled labour (USD/day)



Source: WFP mVAM

In Liberia, May manual labour wage rates remained stable in comparison to April. Rates decreased in Bong (-4%), Grand Bassa (-5%), Margibi (-4%) and Montserrado (-2%). Conversely, wage rates increased by 4 percent in Margibi and by 3 percent in Nimba. With the start of the rainy season, the demand for agricultural labour will continue to fall and therefore wage levels will also fall in rural areas.

In Sierra Leone, wage rates rose by 3 percent in May. Wage rises were noted in most districts, led by Bombali/Tonkolili/Koinadugu (+12%) and Bonthe/Pujehun/Moyamba (+6%). After an increase in April, wage rates fell by 8 percent in urban parts of Western Area.

Stable terms of trade with localized fluctuations

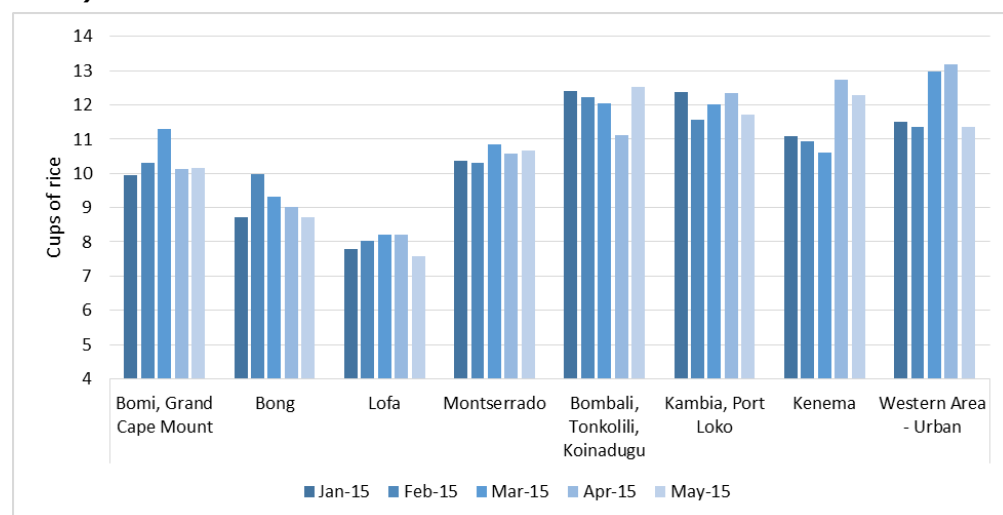
Wage-to-imported-rice terms of trade were largely stable in Liberia in May. The most notable decreases were in Lofa (-8%) and Grand Bassa (-6%). With a daily wage of just 7.5 cups of imported rice, purchasing power remains the lowest in Lofa. In Grand Bassa, purchasing power is resilient at 10.6 cups for the daily wage, in spite of a fall in wages.

In Sierra Leone, wage-to-local-rice terms of trade remained stable in May, with two exceptions. Wages rose by 12 percent in Bombali, Tonkolili and Koinadugu, pushing up purchasing power by 13 percent. Conversely, wages fell by 8 percent in urban parts of Western Area, resulting in a 14 percent decrease in purchasing power. The best terms of trade in May were in the counties of Bonthe/Pujehun/Moyamba, where the daily wage bought 12.8 cups of local rice. The lowest were in the counties of Kailahun/Kono, at 11.1 cups per daily wage.

Table 2: Food price trends

Aggregation	Mar - Apr changes			Apr-May changes		
	Imported rice	Local rice	Palm oil	Imported rice	Local rice	Palm oil
Liberia	1%	0%	-1%	-1%	2%	-1%
Lofa	9%	8%	7%	0%	4%	-2%
Sierra Leone	-1%	0%	0%	2%	0%	-3%
Kambia/Port Loko	7%	4%	-3%	-4%	0%	-1%

Figure 8: Wage-to-rice terms of trade (imported rice in Liberia, local rice in Sierra Leone)



Source: WFP mVAM

Perceptions of food security in May

To gauge perceptions of food security in May, we used the Pattern sentiment analysis algorithm developed by the Computational Linguistics & Psycholinguistics Centre at University of Antwerp. For a given sentence, the algorithm returns the 'polarity': a measure of how positive/negative the statement is on a scale of -1.0 to +1.0.

Figure 9: Word cloud for Liberia



In Liberia, the term 'Ebola' was ranked seventeenth in May (as it was in April), while in Sierra Leone it was the second most-used word, even if it was mentioned 20 percent less frequently in May than in April. This corresponds with the number of Ebola cases reported in both countries.

In Liberia, the most used words were 'hard' and then 'bad', with 'good' ranked third. In Sierra Leone, negative words such as 'difficult,' 'hard,' and 'problem' ranked the highest, while the term 'good' only ranked eleventh. This suggests that respondents in Sierra Leone are worried about food security, while in Liberia people are divided on their perception of the food situation. Nevertheless, in Sierra Leone, respondents used negative words 17 percent less frequently than in April. This observation is confirmed by the sentiment analysis above.

Figure 10: Word cloud for Sierra Leone



In the words of respondents

Sierra Leone

- "Food situation in my district is very much deplorable as we are currently in the raining reason. As you know most people are on agricultural activities." Male respondent from Kailahun
- "The food situation is very difficult especially for the poor and disable people." Female respondent from Bombali
- "We are lack of food in our community. Due to lack of local market people were been stop to do trading in our community." Male respondent from Kambia
- "Food stuffs are available but very expensive. Some traders deliberately raised the prices of food stuffs and blame it on the Ebola crisis." Female respondent from Port Loko.

Liberia

- "The food conditions are very bad because there is less food for an individual in our community due to less job opportunity." Female respondent from Bomi
- "Very hard to get food in my community. We go from community to community to find food. Sometimes we borrowed food from our neighbours." Female respondent from Bong
- "Now that we are in the dry season, the prices of food is increasing day by day. Therefore, it is very difficult for those who cannot afford to eat better." Male respondent from Lofa
- "FOOD! FOOD! FOOD! Food can be found everywhere and at every time. But the question is, how do I get it for my family and I... NO MONEY. All because --- NO JOB." Male respondent from Margibi

Conclusions and Outlook

In May, we see an improving trend of the coping levels in rural areas that have been affected by Ebola, as well as for households headed by women and for the poorest households. Geographically, the biggest improvements are seen in Bong County, Liberia and in the districts of Kambia and Port Loko in Sierra Leone.

Panel data analysis shows continued improvements in the coping mechanisms. For Liberia, the panel data is able to explain 76 percent of the variance in rCSI and shows that the average household has experienced a month-on-month improvement of 4.6 percent starting from January. For Sierra Leone, the model can explain almost 80% of the variance, where an average household monthly improvement of 8.42 percent is estimated. This is a very surprising result as Sierra Leone has yet to entirely eliminate Ebola.

Although we see overall improvements, borderline food-secure households may be having difficulty in acquiring food. This applies only to Sierra Leone, as slight decreases in prevalence are observed amongst urban and wealthier sub-populations in Liberia.

In Liberia prices and wages remained stable, while in Sierra Leone trends were mixed. This also partially reflected in stable wage-to-imported-rice terms of trade in both countries. However, the lean season is approaching, and PRESAO is forecasting rainfall deficits that could have a negative impact on the agricultural campaign.



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To download mVAM data on the Ebola-affected countries, please visit: http://vam.wfp.org/sites/mvam_monitoring/Ebola.html