

Maintains



Research supporting social
services to adapt to shocks

Towards shock-responsive social protection: estimates from the COVID- 19 microsimulation in Sierra Leone

Research Report

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About Maintains

This five-year (2018–2023) operational research programme is building a strong evidence base on how health, education, nutrition, and social protection systems can respond more quickly, reliably, and effectively to changing needs during and after shocks, whilst also maintaining existing services. Maintains is working in six focal countries—Bangladesh, Ethiopia, Kenya, Pakistan, Sierra Leone, and Uganda—undertaking research to build evidence and providing technical assistance to support practical implementation. Lessons from this work will be used to inform policy and practice at both national and global levels.

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Executive summary

This report presents the methodology for, and the results of, a microsimulation for Sierra Leone that was implemented based on a partial equilibrium modelling framework using nationally representative household-level data. The findings from the model include: an estimate of the potential impact of COVID-19 on poverty in Sierra Leone, based on a model that assumes heterogeneity of impact across individuals and households, depending on the type and sector of employment; and an assessment of the effectiveness, coverage, and adequacy of the social protection response to COVID-19. These microsimulation results complement a larger Sierra Leone [country case study](#), and a [policy brief](#) setting out the key findings.

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List of abbreviations

CPI	Consumer Price Index
ECT	Emergency Cash Transfer
FCDO	UK Foreign, Commonwealth and Development Office
GDP	Gross domestic product
GoSL	Government of Sierra Leone
IMF	International Monetary Fund
LPMT	Light Proxy Means Test
Maintains	Maintaining Essential Services After Natural Disasters
PMT	Proxy means test
PWDLH	People with Disabilities Lockdown Handouts
Q1	Quarter one
SLL	Sierra Leonean Leone
SSN	Social Safety Net
UNDP	United Nations Development Programme

1 Introduction

1.1 COVID-19 in Sierra Leone

Sierra Leone confirmed its first COVID-19 case on 30 March 2020. As at 7 December 2020, the country had reported 2,420 cases and 74 deaths, equivalent to 0.97 deaths per 100,000 (World Health Organization, 2020). The Western Urban region of the country (which includes Freetown, the capital) was the first affected area and has borne the brunt of the nation's reported cases, although the virus quickly spread to the rest of the country.

The Government of Sierra Leone (GoSL) adopted a 'light-touch' policy approach in response to COVID-19, eschewing heavily restrictive social distancing policies that it would be unable to enforce, and which might result in serious economic impacts. Prior to the confirmation of the first case, the GoSL declared a 12-month state of emergency effective from 24 March 2020, with the borders closing for 30 days (extended to four months) from 27 March 2020. On 31 March 2020, schools were closed across the country and land borders were closed until June. This was followed by a pair of three-day lockdowns, during which people were required to stay at home, which took place between 5 and 7 April and 3 and 5 May 2020. The purpose of the lockdowns was to scale up contact tracing and testing abilities. In addition, from the onset, a curfew was in place, shops were instructed to sell only essential items and, where possible, people were instructed to remain at home. From 1 June 2020, a national mask-wearing mandate began.¹ From 24 June, the GoSL began to ease lockdown restrictions, including lifting a ban on inter-district travel, easing the curfew, and, from July, allowing places of worship and the airport to re-open.

Despite the relatively limited restrictions in place in Sierra Leone (in comparison to other countries), quarantines, lockdowns, curfews, and restrictions on inter-district travel disrupt economy activity and result in negative socioeconomic consequences, especially in a country where two-thirds of the economy is in the informal sector (United Nations Development Programme (UNDP), 2020). Pre-COVID-19, real gross domestic product (GDP) growth for 2020 was estimated at 2.3–4% (World Bank, 2020b). In June 2020, the GoSL revised real GDP growth projections from 4.2% down to a maximum of 3.8% and a minimum of 2.2%, depending on the impact scenario used (GoSL, 2020). At the time of writing, however, the latest figures from Statistics Sierra Leone now predict a negative GDP growth of -2.2%.²

Some studies on the economic impact of the recent Ebola epidemic in Sierra Leone can provide guidance on the likely impact of restrictions on movement. Research on the impact of Ebola on agricultural production shows that the agribusiness chain was disrupted by the containment (restriction on travel, reduction of daily business, abolition of Sunday trading, closure of banks). The transport sector was also badly affected during the Ebola epidemic, with a sharp decline in demand for commercial vehicles due to restrictions on vehicle movement. *Okada* drivers (i.e. motorcycle taxi drivers) were also badly affected by school closures, reductions in business hours, and curfews. Other sectors badly affected included retail and hospitality, which were both hit by a reduction in incomes and constraints on public

¹ See Shaban (2020) for a full timeline of restrictions.

² Report on the 2019 and 2020 real gross domestic product (RGDP) figures, at 2006 prices.

gatherings (Davis, 2015). Businesses in both sectors were the most likely to close, to stop production, or to reduce operations (35% of retail businesses reduced operations and 50% of businesses reported decreasing the number of employees) (UNDP, 2015).

While some of these impacts are likely to be observed also in the case of the current pandemic, in the current case the internally derived negative effects are accompanied by restrictions on trade and travel at the global level. International containment measures restrict global trade and limit travel, which, coupled with the downturns in the global economy, reduce demand for commodities and tourism services. Moreover, a sharp reduction in received remittances is expected (UNDP, 2020).

In the mining sector, social distancing results in downsizing of workers and reduction of working hours. Revenue from mining dropped from US\$ 2.24 million (£1.7 million)³ in April 2019 to just US\$ 0.33 million (£0.25 million) in April 2020: an 85% decline year on year, according to Mines Ministry figures seen by Reuters (KPCSC, 2020). The pandemic has caused the most of the mining companies to stop their operations, and stalled large-scale mining operations (UNDP, 2020).

A recent mobile phone survey run by the UNDP (2020) indicates that 68% of business owners have seen their weekly income halve since March 2020, 57% of them have had to lay off workers, and 37% have reduced their working hours. Further, the results suggest a drop of 20% in the number of households that are able to consume all meals in a week from April to July, and that 30% of households have had to reduce their daily meals because of the crisis, suggesting a sharp decline in food security.

The outbreak of COVID-19, and the disruption in the global supply chain, have put upward pressure on prices. In quarter 1 (Q1) 2020 inflation increase was driven mainly by jumps in food prices because of supply bottlenecks (World Bank, 2020b). However, the net COVID-19 impact on inflation is predicted to be mild in Sierra Leone (UNDP, 2020).

1.2 This report

This report presents the results of a microsimulation for Sierra Leone that was implemented based on a partial equilibrium modelling framework using nationally representative household-level data. The findings from the microsimulation include: an estimate of the potential impact of COVID-19 on poverty in Sierra Leone, based on a model that assumes heterogeneity of impact across individuals and households, depending on the type and sector of employment; and an assessment, based on the model, of the effectiveness, coverage, and adequacy of the social protection response to COVID-19.

³ All conversions to GBP in this report use Google Currency Converter exchange rates as at 22 December 2020.

2 Methodology

2.1 Data sources

Table 1 summarises the key data sources used to parametrise and estimate the microsimulation model. The 2018 Integrated Household Survey provides the household-level data on which the simulation is based. Data on population growth by area of residence is used to update household-level weights to reflect the 2020 situation. All the other data sources are used to define parameters related to the impact of the pandemic on each main economic sector, and on inflation.

Table 1: Data sources for the microsimulation

Data	Source	Year
Integrated Household Survey	Statistics Sierra Leone	2018
Urban and rural population data	World Development Indicators (World Bank)	2018–2020
Actual and projected GDP by sector	Statistics Sierra Leone	2018–2020
Consumer Price Index (CPI)	International Monetary Fund (IMF) and Statistics Sierra Leone	2018–2020
COVID-19 impact mobile survey data	International Growth Centre ⁴	2020

2.2 Channels of impact

Economic hardship experienced by families because of the global pandemic and resulting economic downturn is expected to increase poverty, especially among more vulnerable groups like children. In the short term, households will be affected by the shock through multiple channels: income from labour is likely to decrease because of direct health consequences, as well as reduced economic activity due to quarantine measures and global recession; non-labour income, in the form of remittances and public transfers, is likely to change; consumption expenditure will be affected by price changes for, and possibly shortages of, some goods, as well as by a rise in out-of-pocket expenditure; and service disruptions (suspension of education services, reduction of public transportation, saturation of the health system) are likely to negatively affect monetary welfare dimensions (World Bank, 2020a).

Our approach considers two main channels for the impact on household welfare – namely, income and prices – and allows for a full accounting of the heterogeneous nature of COVID-19 economic shocks. Employment income can be completely lost due to loss of employment, or wages can be reduced due to lower economic activity.⁵ Both the probability of employment loss and the percentage of wage reduction depend on the sector and on the nature of employment to account for differences between casual and more permanent types

⁴ See www.theigc.org/project/covid19-sl/ for further details.

⁵ The direct negative impact of the pandemic on employment income through illness is not considered. Similarly, the impact of higher out-of-pocket expenditure because of illness is not modelled.

of employment. The impact on income from self-employment depends on the sector of activity.

Non-labour income may also be affected through changes in remittances as a result of COVID-19. The change in economic activity may alter the supply and demand of different goods or services, leading to price changes. The impact of inflation (especially food inflation) on consumption expenditure is therefore modelled.

2.3 Approach

To assess the adequacy, coverage, and comprehensiveness of the social protection response to COVID-19, we conducted a microsimulation based on a partial equilibrium modelling framework using nationally representative household-level data. To do this, we simulated the impact of the pandemic on poverty and inequality, as well as the effect of social protection policies that can mitigate negative effects on people's wellbeing. The post-COVID-19 and post-social protection measures scenarios are compared to a pre-COVID-19 baseline scenario, which estimates the expected poverty and consumption level in the absence of the pandemic.

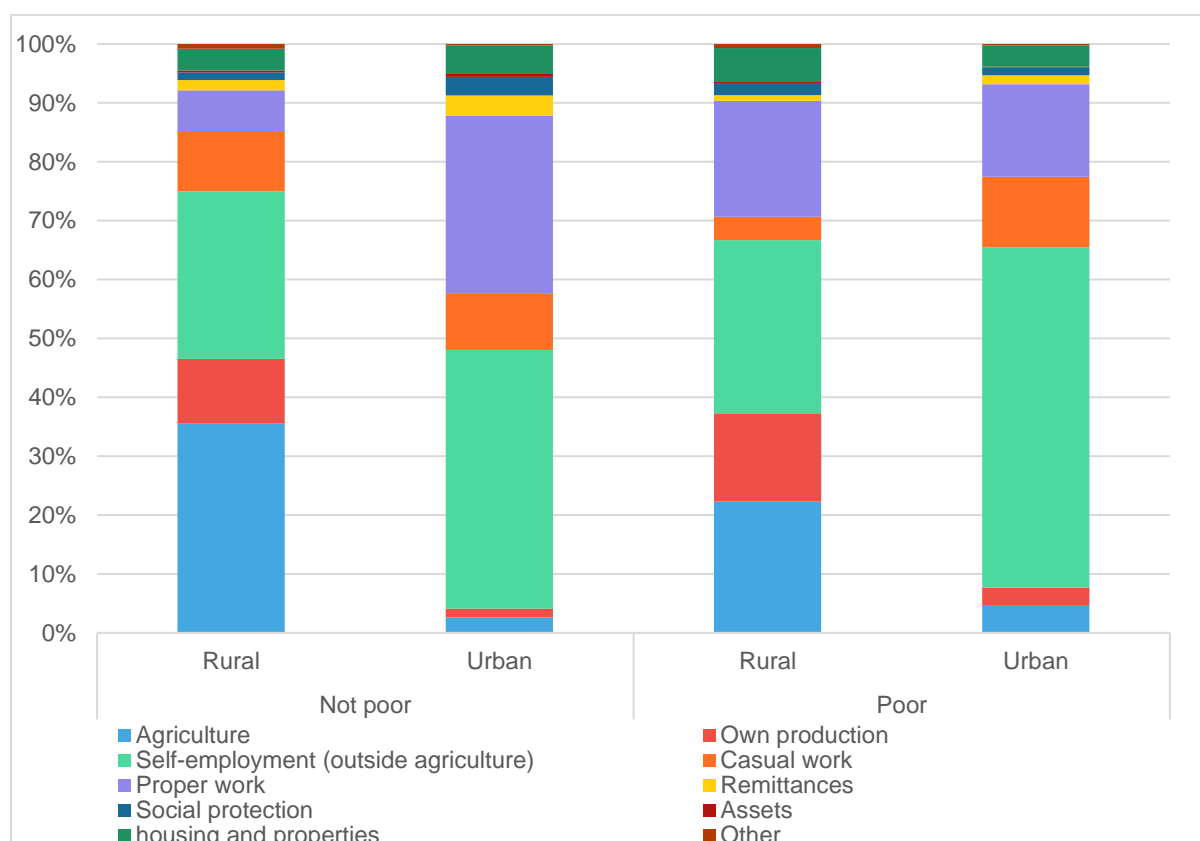
2.3.1 Baseline scenario

To obtain income and consumption estimates that reflect the situation in Sierra Leone in 2020 before the impact of COVID, the 2018 Integrated Household Survey data are adjusted in two ways. First, sampling weights are adjusted to reflect the growth in population and urbanisation between 2018 and 2020, based on population growth projections by area of residence (see Table 18 in Annex A). Having a dataset that reflects population size in 2020 allows us to directly simulate implemented policy interventions based on actual or expected coverage.

Second, household-level employment and business income by sector is increased with a pass-through rate of 0.525,⁶ based on estimated real *per capita* GDP growth by sector between 2018 and 2020, where for 2020 we use pre-COVID-19 growth projections (see Table 19 in Annex A). Real income growth is then fully passed on to real consumption expenditure.

In terms of understanding the possible impact of COVID-19, it is useful to assess what are the main income sources of the poor at baseline. These are shown in Figure 1.

⁶ This is based on estimates of Sierra Leone point-to-point elasticity (2003–2011), with pass-through based on GDP *per capita* in constant Local Currency Unit (World Bank, 2018).

Figure 1: Income sources across geographical areas and level of poverty, 2020

2.3.2 COVID-19 impact scenarios

Given the level of uncertainty regarding the actual impact of COVID-19 on employment income and remittances, we have modelled three impact scenarios with different levels of impact. The 'short-term' impact scenario adopts the most dramatic assumption regarding the impact of the pandemic, based on the expected impact of lockdown and restriction measures and on the likely impact on the most affected sectors of the economy. The 'transition' scenario mitigates the impact parameters, assuming that over time some of the negative effects of the pandemic will fade. Finally, the 'recovery' scenario adopts the most optimistic set of assumptions to model a situation where the impacts of the pandemic have almost faded away.

Assumptions regarding the level of price and income changes are based on available sector-level GDP projections, estimates from a household-level COVID-19 impact mobile survey, the type of containment measures (stringency of lockdowns), and available information on changes in prices.

Income impact channel

Household income is impacted through a decrease in the level of remittances received and through a shock to the employment of, and/or the business income received by, each household member. The latter is the result of an unemployment effect for a certain percentage of individuals who lose all their income, and a reduced income effect for all workers who do not become unemployed, and for those who are self-employed or own a

business. The size of the employment and business loss depends on the sub-sector of employment (ISIC codes, Rev.4), and on the nature of the employment, i.e. casual, permanent, or self-employment/household business.

Shock on employment of employees:

- U_c % of casual wage workers and U_p % of permanent wage workers in sector of employment s become unemployed and suffer a 100% wage income loss during a period t . Typically $U_p > U_c$.
- The unemployment shock is randomly assigned across permanent and casual waged workers within sector s . Results are obtained by repeating the random selection process 100 times and obtaining the average estimate. This is done to ensure that the results are robust and more representative.

Shock on wage incomes of employees and self-employed:

- All remaining $(1 - U_c)$ % casual workers and $(1 - U_p)$ % permanent workers lose W_c % and W_p % of their pre-crisis wage incomes, as a result of the COVID-19 crisis during a period t .
- To capture heterogeneity, the percentage of wage income loss is modelled as a normal distribution.

Shock on households' business income:

- Business income in sector s is reduced by Δ_B %.
- While business income from agricultural production can be affected by the pandemic, agricultural production used for own consumption is assumed not to be impacted by the crisis.

The resulting drop in member-level income translates into a drop in household-level employment and business income.

Table 2 and Table 3 list the parameters used for the microsimulations for employment income drop and business income drop, respectively. The probability of unemployment and the percentage of employment income loss are higher among casual workers than among permanent workers across all scenarios. Moreover, the 'Accommodation and food service' and 'Arts, entertainment and recreation' sectors are the most severely affected in all scenarios. The 'Transportation and storage', 'Retail', and 'Mining' sectors are the second most affected by the pandemic. On the other hand, the 'Public' sector (public administration, education, and human health activities), the 'Financial' sector, 'Real estate' sector, and the 'Professional, scientific, and technical' sector are assumed not to be affected by the crisis. The assumptions regarding the size of income drop and unemployment probability are based on analysis of the International Growth Centre's phone-based survey on the economic consequences of and response to COVID-19, on the Sierra Leone Government's GDP growth forecast by sector, on Sierra Leone economic updates, and on the findings from studies on the impact of Ebola on the various economic sectors.

Table 2: Assumptions regarding percentage drop in casual and permanent employment income

Sector	Short term				Transition				Recovery			
	U _P	U _C	W _P	W _C	U _P	U _C	W _P	W _C	U _P	U _C	W _P	W _C
Agriculture, forestry, and fishing	5	15	15	30	0	10	5	15	0	5	5	10
Mining and quarrying	15	50	25	50	10	25	15	25	5	15	5	15
Manufacturing	10	20	20	40	5	10	10	20	0	5	5	10
Electricity, gas, steam, and conditioning	0	0	0	0	0	0	0	0	0	0	0	0
Water supply, sewerage, waste management	0	0	0	0	0	0	0	0	0	0	0	0
Construction ^a	10	20	25	50	5	10	15	25	5	5	5	15
Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods	10	50	25	50	5	25	10	25	0	15	5	15
Transportation and storage	10	50	25	50	5	25	10	25	0	15	5	15
Accommodation and food services activities	15	60	45	90	10	30	30	60	5	15	15	30
Information and communication	0	0	0	0	0	0	0	0	0	0	0	0
Financial and insurance activities	0	0	0	0	0	0	0	0	0	0	0	0
Real estate activities	0	0	0	0	0	0	0	0	0	0	0	0
Professional, scientific, and technical	0	0	0	0	0	0	0	0	0	0	0	0
Administrative and support service activities ^b	5	10	15	30	0	5	10	15	0	0	5	10
Public administration and defence	0	5	15	15	0	0	10	10	0	0	5	5
Education	0	5	15	15	0	0	10	10	0	0	5	5
Human health and social work activities	0	5	15	15	0	0	10	10	0	0	5	5
Arts, entertainment, and recreation	15	60	45	90	10	30	30	60	5	15	15	30
Other services activities ^c	10	25	20	30	5	15	10	15	0	5	5	10
Activities of households as employers;	0	5	0	10	0	0	0	10	0	0	0	5
Activities of extraterritorial organisations	0	0	0	0	0	0	0	0	0	0	0	0

Note: Based on COVID-19 mobile survey data: ^a employees in the construction sector report a drop in wage of slightly over 50% (we assume this is the case for casual workers); ^b employees in administrative activities report a drop of 15%; and ^c employees in other service type activities report a drop of roughly 20% of wage income.

Table 3: Assumptions regarding percentage drop in business income (Δ_B)

Sector	Short term	Transition	Recovery
Agriculture, forestry, and fishing ^a	15	10	5
Mining and quarrying	50	25	15
Manufacturing	20	10	5
Electricity, gas, steam, and conditioning	0	0	0
Construction	30	20	10
Wholesale and retail trade; repair of motor vehicles, motorcycles, and personal and household goods ^b	50	30	15
Transportation and storage	25	15	10
Accommodation and food services activities ^c	75	50	25
Information and communication	0	0	0
Financial and insurance activities	0	0	0
Professional, scientific, and technical	0	0	0
Administrative and support service activities	0	0	0
Public administration and defence	0	0	0
Education	0	0	0
Human health and social work activities	0	0	0
Arts, entertainment, and recreation ^d	90	50	25
Other services activities ^e	30	20	10
Activities of households as employers	0	0	0
Activities of extraterritorial organisations	0	0	0

Note: Based on COVID-19 mobile survey data: ^a farmers report a loss of sales of 15%; ^b business owners in the retail sector report a drop of income of 50%; ^c business owners in hospitality report a drop of 70%; ^d businesses in arts and recreation report a drop of 90%; and ^e businesses in other services report a drop of 30%.

Shock on remittances:

- Domestic remittances received in kind and/or in cash are reduced by RD%.
- Foreign remittances in-kind and in cash are reduced by RCF% and RCK%, respectively.
- Remittances sent are assumed to be a constant share of household income.

Table 4 summarises our assumptions on the drop in remittances under the three modelled scenarios. The short-term impact scenario assumes that domestic remittances have completely stopped for the four months of restricted non-essential inter-district travel, and have been reduced by 20% during the remaining months. Foreign remittances in-kind are assumed to have stopped completely for 12 months due to the suspension of international flights and the closing of land borders, while cash remittances are assumed to drop by 23% based on World Bank estimates for sub-Saharan Africa. In the transition scenario we assume that both domestic and foreign remittances will increase to 80% of their pre-crisis level, except for in-kind foreign remittances, which are likely to remain constrained because of travel restrictions. Finally, under the recovery scenario, cash and in-kind domestic remittances and foreign remittances in cash are assumed to be at 90% of their original level.

Table 4: Assumptions regarding percentage drop in remittances, by scenario

Type	Short term	Transition	Recovery
Domestic – cash/in-kind	47%	20%	10%
Foreign – cash	23%	20%	10%
Foreign – in-kind	100%	80%	50%

Shock on other income sources:

- Other income sources (pension, public transfers, etc.) are assumed to stay constant.

Employment and other income shocks are compiled to obtain a revised household-level income estimate and percentage income drop estimate. Given that income data do not correspond perfectly to consumption, the assumption here is that income shocks translate into consumption linearly for the part of consumption that does not come from own production, while consumption expenditure from own production is assumed to be constant.

Price impact channel

A household-specific food, education, health, housing, and other non-food items price index that captures inflation due to COVID-19 is used to estimate the differential impact of the projected price increases on the purchasing power of the households, depending on household-specific consumption patterns. For instance, poor households tend to have a larger share of food consumption and are therefore proportionally more affected by changes in food prices. Consumption expenditure from own production is not deflated as it is assumed to be immune from the impact of price changes.

We deflated household-level consumption by multiplying household-level consumption within each category by the ratio between CPI inflation between 2018–2020 pre-COVID-19 and CPI inflation 2018–2020 as observed post-COVID-19.

CPI inflation post-COVID-19 is computed assuming that prices change linearly with respect to the observed CPI between January and August 2020 (see Table 5). CPI inflation in the absence of the pandemic shock is computed assuming that CPI inflation between 2019 and 2020 would have been the same as CPI inflation between 2018 and 2019. As we see from Table 5, the pandemic is having an inflationary impact on food prices mainly, whereas non-food prices have been declining.

Table 5: Assumptions regarding CPI inflation by type of goods (2018–2020)

Type	Pre-COVID-19	Observed with COVID-19	Ratio
Overall	1.32	1.31	1.01
Food	1.18	1.23	0.96
Education	1.69	1.76	0.96
Housing	1.27	1.20	1.06
Other non-food items	1.40	1.29	1.09

Source: Author, based on CPI data from IMF and Statistics Sierra Leone.

Poverty estimation

Based on the estimated post-COVID-19 consumption expenditure, the revised headcount poverty rate and poverty gaps are estimated using the following poverty lines:

- the annual national absolute poverty line per adult equivalent (3,921,000 Leones (SLL) or £289 in 2018);
- the middle-income class poverty line of US\$ 3.20 (£2.40) (2011 PPI) *per capita* per day; and
- the lower middle-income class poverty line of US\$ 1.90 (£1.40) (2011 PPI) *per capita* per day.⁷

Headcount poverty and poverty gaps *ex-post* COVID-19 are compared with the equivalent estimates at baseline, i.e. pre-COVID-19. Focusing on the national absolute poverty line only, we also compute headcount poverty by rural/urban location and by province, as well as looking at the expected increase in poverty by a set of household characteristics (i.e. household size, presence of members with a disability, sex and age of household head, head employment status, and sector of employment).

In addition, we conduct some analysis of households that fall into poverty because of COVID-19. For those we estimate:

- the number of individuals that become poor because of COVID-19, i.e. those who live in households that were above the national poverty line at baseline and are below it post-shock;
- the average amount and percentage loss of consumption because of COVID-19; and

⁷ The 2018 value in Leones of the monthly equivalent of the per adult equivalent national poverty line and *per capita* US\$ 1.90 and US\$ 3.20 poverty lines would be 326,750, 195,066, and 328,533 respectively.

- the average shortfall from the poverty line for households that fall into poverty because of COVID-19, and for those that become poorer because of COVID-19.

2.3.3 Social protection impact scenarios

We use the three post-COVID-19 scenarios to further simulate the mitigating effects of the most relevant cash-based social protection measures that have been, or are going to be, implemented in 2020, based on information on expected coverage, target groups, and amount and duration of benefits.⁸ Table 6 gives an overview of the three programmes we simulate using our model. The People with Disabilities Lockdown Handouts (PWDLH) and the Urban Emergency Cash Transfer (ECT) have been introduced as one-off transfers in response to the pandemic, while the COVID-19 Social Safety Net (COVID-19 SSN) provides 9 months of support to 65,000 households in response to the pandemic.

Determining eligibility for the programmes in the data is not straightforward due to the nature of the selection processes, which involve some subjective elements, and due to the uncertainty of the exact selection criteria. We based our assumption regarding the eligibility requirements based on the available information on each programme target group and selection modality. Given that the size of the eligible population for each programme is much larger than the expected programme coverage, we randomly allocate benefits across eligible households. The random allocation is repeated 100 times.

At each round of random selection, the amount of the transfer is added to the selected beneficiary households' income to generate an expected average impact on income.⁹ The expected impact on income is then translated into consumption based on the same assumption used for the overall COVID-19 impact. Finally, revised poverty headcount estimates and statistics on the impoverished population are produced.

⁸ For a full description of these programmes, see the Sierra Leone case study report, available [here](#).

⁹ The transfer value amount is deflated to 2018 prices using food CPI inflation, rather than overall CPI inflation. This is to account for the fact that most of the transfer is likely to be spent on food by the target beneficiary population, and to avoid bias given by the fact that non-food inflation in Sierra Leone is particularly high and seems to be disproportionately influenced by the price of imported goods.

Table 6: Social protection measures simulated

Measure	Coverage (no. of households)	Total annual value (SLL/GBP)	Eligibility
PWDLH (first lockdown) – cash transfer, 25kg rice bag, and soap bar	3,367	SLL 400,000 / £29	Urban residency, 1+ member with a disability, bottom 80% of baseline per adult equivalent consumption distribution ^a
PWDLH (second lockdown) – cash transfer only	7,616	SLL 250,000 / £18	Urban residency, bottom 80% of baseline per adult equivalent consumption distribution ^b
ECT	67,700	SLL 1,309,000 / £96	Urban area household in selected districts, 1+ member manages a micro enterprise ¹⁰ outside agricultural sector AND/OR the head works as casual worker in the service sector, household passes the 'light' proxy means test (LPMT) ^c
COVID-19 SSN – horizontal expansion	65,000	2,659,000 / £195	Household lives in the 13% poorest Primary Sampling Unit in its district, household passes the proxy means test (PMT) test ^d
COVID-19 SSN – top-up for households with people with disabilities	-	450,000 / £33	Household benefits from the SSN and has 1+ member living with a disability ^e

Notes: ^a PWDLH's intended target group was made up of people with a 'visible' disability who live in extreme poverty (e.g. living on the streets) and targeting was based mainly on the subjective judgement of the officer. We assume that beneficiary households were selected from among the poorest 80% of households nationally, and that they have one or more member reporting at least a lot of difficulty on at least one of the questions of the Washington Group short set of questions (excluding the question on cognitive impairments).

^b The second tranche of the PWDLH was targeted the poor and destitute, orphans in institutions, albinos and children with mental disabilities. We assume that beneficiary households are among the poorest households because we cannot replicated the other criteria.

^c ECT implemented a three-stage targeting approach: 1) geographical targeting covering the five regional headquarters; 2) categorical targeting based on employment sector, as indicated in the lists given by city councils, the Ministry of Labour and Social Security, the Employers Federation and Microfinance Institutions, trade associations, and other

¹⁰ Statistics Sierra Leone defines small and medium-scale enterprises as micro enterprises having one to four employees, and small enterprises having five to 19 employees.

organised market groups that provided lists of potential beneficiaries; 3) a LPMT informed by data from the 2015 census. The three steps were replicated by: 1) using coverage by district headquarters as found in Table 20 in Annex A; 2) using information on employment sector from the data; and 3) screening households based on the LPMT.

^d The COVID-19 SSN's targeting combines geographical targeting, community-based targeting, and PMT screening of potential eligible households. Geographical targeting covers all districts and within district selects the 13% poorest Enumeration areas based on the census, while PMT targeting is based on a PMT. We assume here that the programme targets households in the poorest 13% Primary Sampling unit in each district. We cannot replicate the effect of community targeting and we assume that the PMT used for screening is similar to the light-touch PMT used for the urban ECT.

^e We assume that all COVID-19 SSN beneficiary households with one or more member reporting at least a lot of difficulty on at least one of the questions of the Washington Group short set of questions receives a disability top-up.

3 COVID-19 impact on poverty and consumption

Our estimates suggest a significant increase in headcount poverty in Sierra Leone because of COVID-19 (Table 7). In the highest impact scenario, the number of poor individuals is predicted to increase by around one-third, leading to approximately 6.2 million total poor in Sierra Leone.

Table 7: Official, baseline, and post-COVID-19 headcount poverty by scenario (% of population)

Scenario	Extreme poor (US\$ 1.90)	National poverty line ¹¹	Poor (US\$ 3.20)
<i>Official (2018)</i>	43	56.8	76
<i>Baseline (2020)</i>	39.9	56.7	73.7
Post-COVID: Short term	56.9	71.7	85.1
Post-COVID: Transition	50.4	65.7	81.7
Post-COVID: Recovery	45.6	61.8	78.4

Source: Authors, based on the microsimulation results using the 2018 Integrated Household Survey.

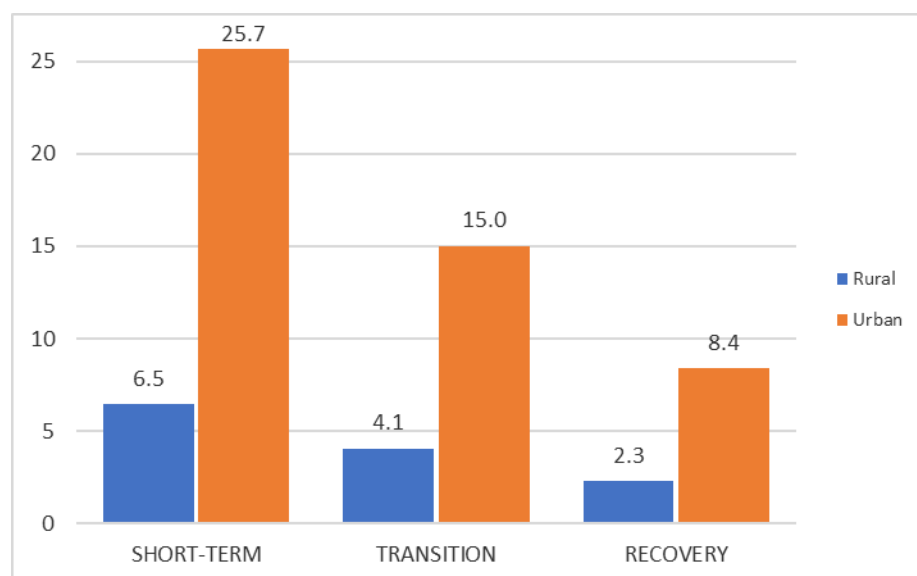
Table 8: Number of newly poor

	Nationally	Rural	Urban
<i>Baseline (2020)</i>	4,905,341	3,592,950	1,312,391
Post-COVID: Short term	1,289,438	323,082	966,356
Post-COVID: Transition	776,909	207,467	569,442
Post-COVID: Recovery	429,118	119,361	309,756

Source: Authors, based on the microsimulation results using the 2018 Integrated Household Survey.

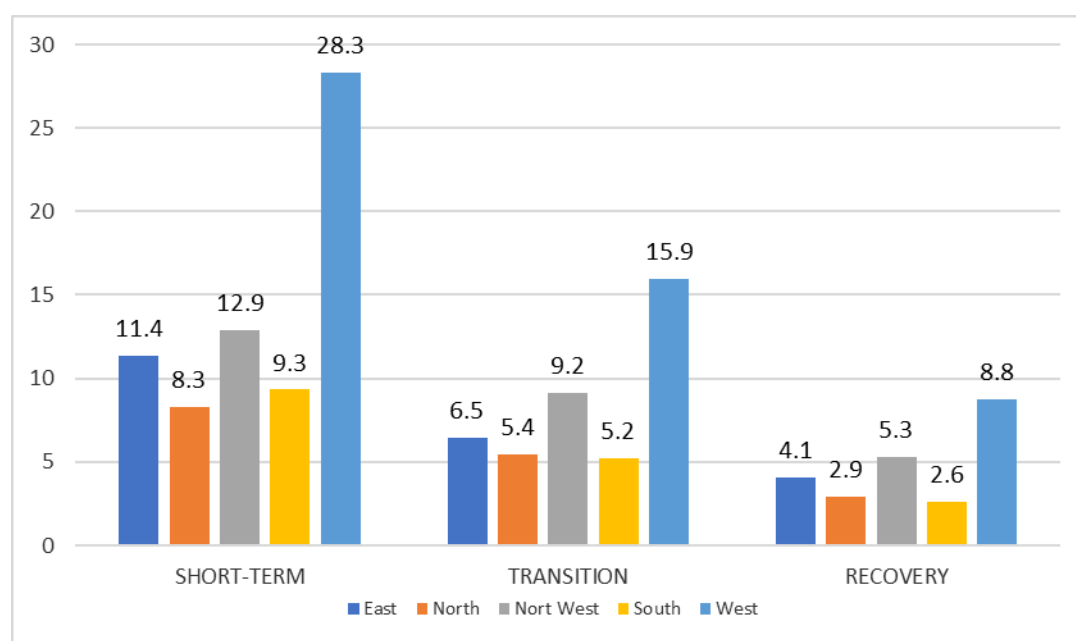
¹¹ The national poverty line is roughly equivalent to US\$ 2.87 (£2.14) at 2011 purchasing power parity.

Figure 2: Percentage point increase in headcount poverty at national poverty line, by area of residence, by scenario



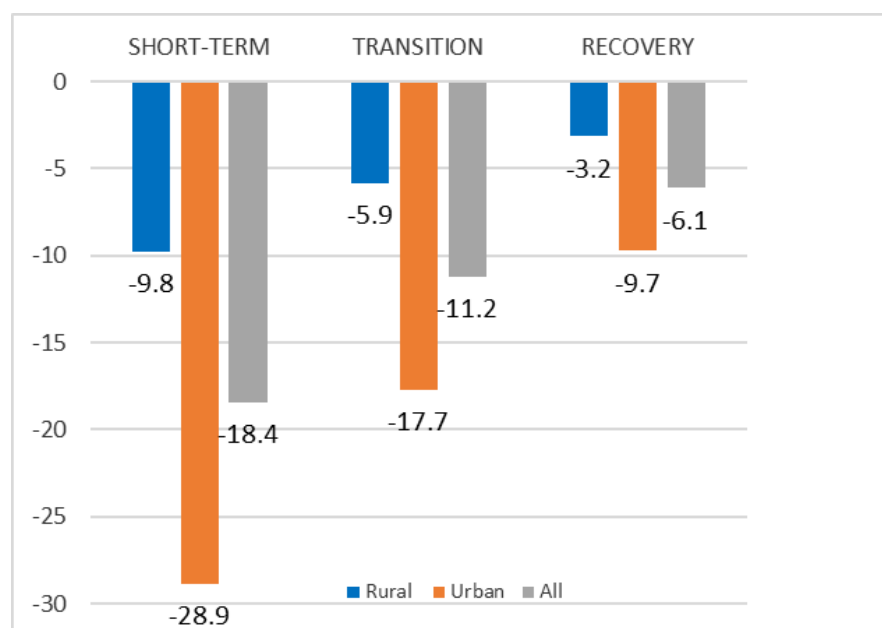
Source: Authors, based on the microsimulation results using the 2018 Integrated Household Survey.

Figure 3: Percentage point increase in headcount poverty at national poverty line, by region



Source: Authors, based on the microsimulation results using the 2018 Integrated Household Survey.

As seen in other countries, we find that COVID-19 has been more disruptive in urban settings. Indeed, the crisis is found to cause a reduction in urban consumption expenditure: this ranges from a one-third reduction in the short-term scenario to a 10% reduction in the recovery scenario. As well as pushing more people below the poverty line, the pandemic is pushing individuals who were already poor into deeper poverty, with the poverty gap among individuals who were poor pre-COVID-19 increasing from 32% at baseline to 45% post-COVID-19 in the short-term scenario.

Figure 4: Average percentage loss of per adult equivalent consumption, by area of residence

Source: Authors, based on the microsimulation results using the 2018 Integrated Household Survey.

Table 9: Change in poverty gap with respect to national poverty line and Gini coefficient

Scenario	Poverty gap	Gini
<i>Baseline (2020)</i>	0.18	0.344
Post-COVID: Short term	0.29	0.346
Post-COVID: Transition	0.24	0.339
Post-COVID: Recovery	0.21	0.341

Source: Authors, based on the microsimulation results using the 2018 Integrated Household Survey.

Table 10: Characteristics of households that fall into poverty with respect to households already in poverty at baseline

	Baseline poor	Newly poor		
		Short term	Transition	Recovery
Household size	7.0	5.8	6.2	6.3
% with 1+ member with a disability	9.3	5.8	6.2	6.3
% with head 65+	12.4	9.4	8.3	5.8
% with female head	24.1	25.2	25.5	23.7
% head is a casual worker	16.2	26.6	24.9	22.0
% head is a formal worker	3.6	13.5	14.0	11.8
% head is self-employed	78.9	57.1	57.0	55.4

% head is unemployed	0.8	2.0	1.6	1.3
% head is out of labour force	9.0	8.7	6.7	6.8
% head works in agriculture	62.8	14.8	16.7	16.5
% head works in services	18.0	53.2	53.2	54.0
% head works in industry	8.0	19.6	20.2	20.5
% living in urban areas	23.7	73.9	72.4	71.6

Source: Authors, based on the microsimulation results using the 2018 Integrated Household Survey.

4 Social protection measures effect

We used the microsimulation model to assess to what extent the three proposed social protection programmes summarised in Table 11 have mitigated the impact of the pandemic on poverty.

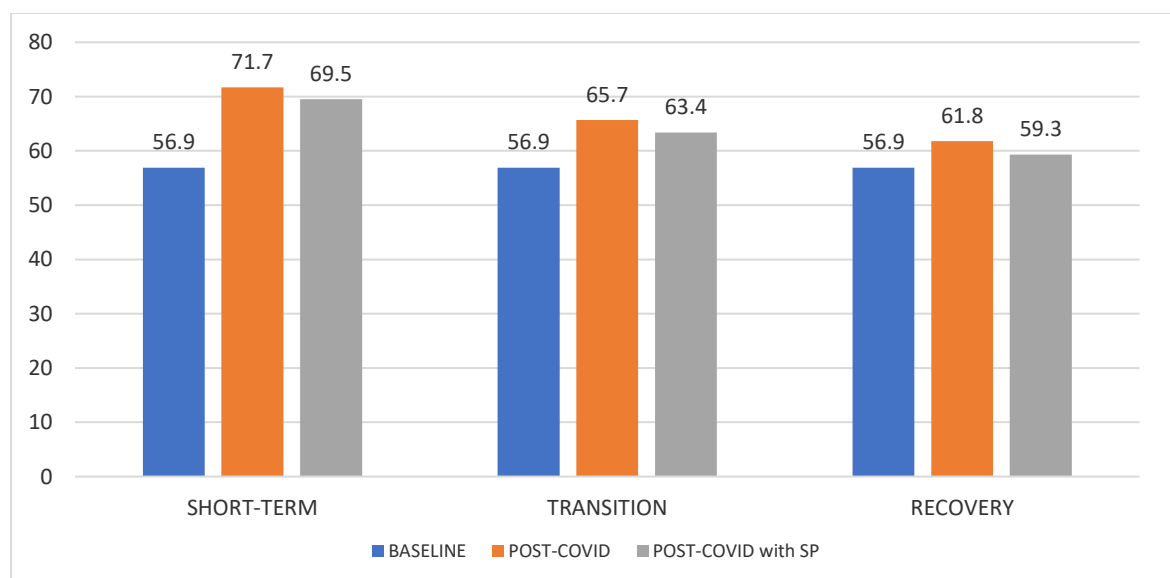
Table 11: Social protection response to COVID-19 in Sierra Leone

	PWDLH	ECT	COVID-19 SSN
Target group	People with disability and the extreme poor	Informal workers and low-wage workers in services industry	Extreme poor and those particularly affected by COVID-19
Frequency	One time	One time	Quarterly payments over nine-month period
Transfer amount	SLL 250,000 (£18) (First tranche only: 25kg bag of rice, bar of soap)	SLL 1,309,000 (£96)	SLL 2,659,000 (£195)

4.1 Poverty impact

Figure 5 highlights the headcount poverty at national poverty line at the baseline and post-COVID-19 with and without social protection interventions. The orange bar shows the estimated poverty levels following COVID-19 without the social assistance transfers discussed above, the grey bar shows the impact of COVID-19 with the transfers. The blue bar indicates a situation without COVID-19. It shows that the three programmes combined are likely to have had only a small impact on reducing poverty. Moreover, as might be expected given the size of the programme, it is COVID-19 SSN that drives the impact on poverty.

Figure 5: Headcount poverty at national poverty line (% of population) at baseline and post-COVID-19 (with and without social protection interventions)



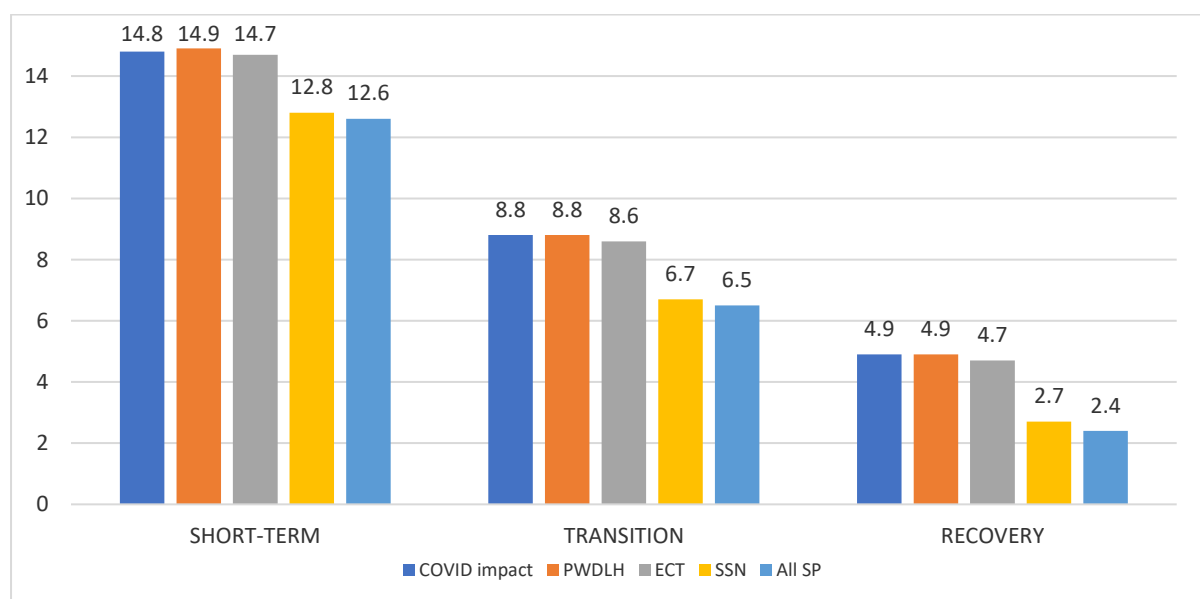
Source: Authors, based on the microsimulation results using the 2018 Integrated Household Survey.

Table 12: Percentage point decrease in headcount poverty with social protection measures

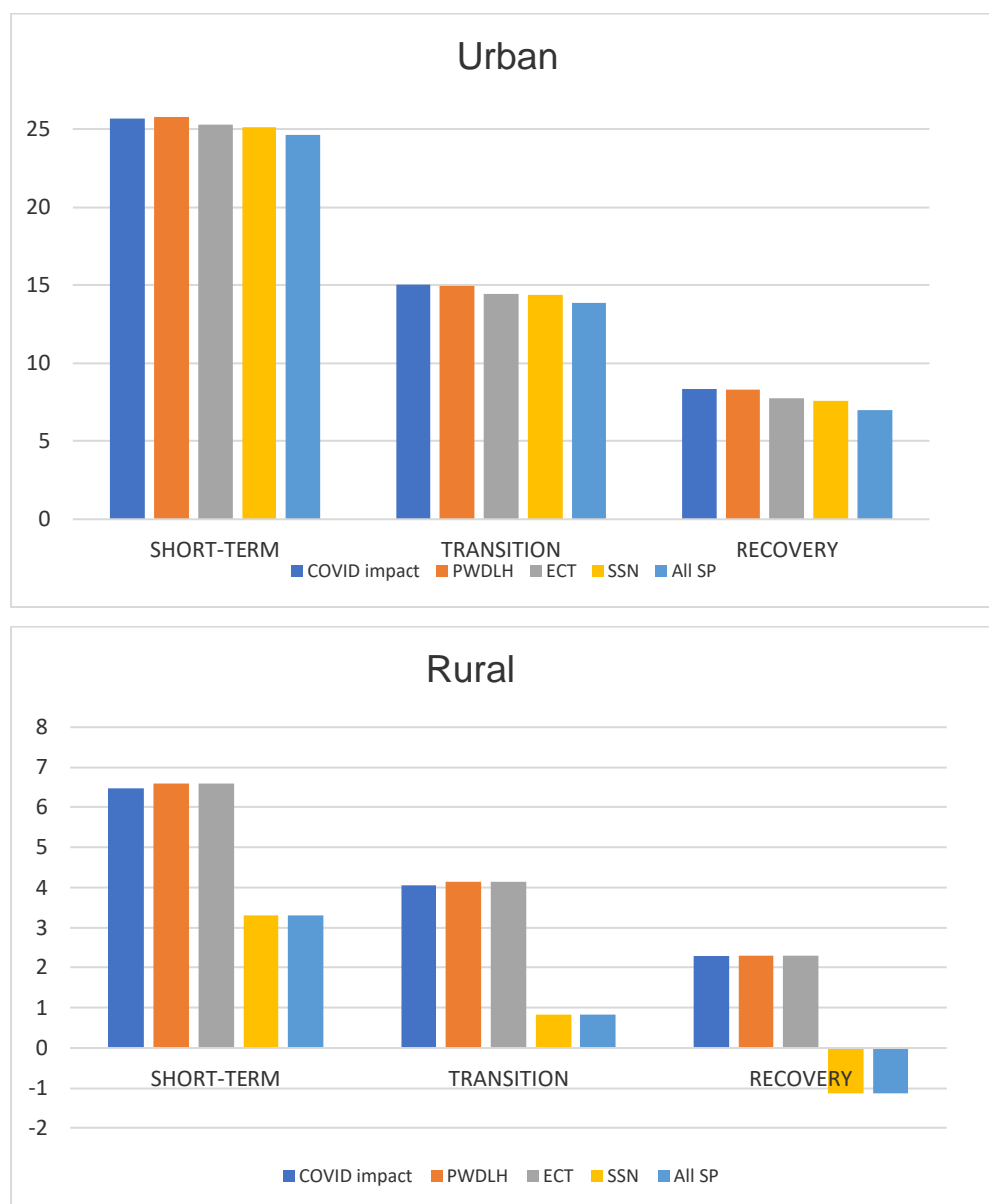
	Extreme poor (US\$ 1.90)	National poverty line	Poor (US\$ 3.20)
<i>Post-COVID-19: Short term</i>	54.7	69.5	85.1
Percentage point decrease with social protection measures	-2.2	-2.2	-1.8
<i>Post-COVID-19: Transition</i>	48.1	63.4	81.7
Percentage point decrease with social protection measures	-2.3	-2.3	-2.0
<i>Post-COVID-19: Recovery</i>	43.4	59.3	78.4
Percentage point decrease with social protection measures	-2.2	-2.5	-2.0

Source: Authors, based on the microsimulation results using the 2018 Integrated Household Survey.

Figure 6: Percentage point increase in poverty headcount at national poverty line with and without social protection measures



Source: Authors, based on the microsimulation results using the 2018 Integrated Household Survey.

Figure 7: Percentage point increase in poverty headcount at national poverty line with and without social protection measures, by area of residence

Source: Authors, based on the microsimulation results using the 2018 Integrated Household Survey.

4.2 Coverage and adequacy

The limited impact of the proposed social protection interventions can be explained by looking at the coverage and adequacy of the programmes. We assessed the coverage of the three cash-based COVID-19 response social protection programmes by looking at the caseload for each social protection programme and the estimated size of the eligible populations (Table 13). With the current funding and caseload, the programmes are covering only a limited share of the eligible population. Only the ECT covers a sizeable share of the eligible population. The COVID-19 SSN cover slightly less than a quarter of the eligible population while the PWDLH cover a minimal share of the eligible population. The need is much higher, given the high level of poverty in the country. Moreover, we are not here assessing the targeting effectiveness of the proposed interventions in terms of reaching the

poorest. It is likely that when targeting errors are accounted for, the effective coverage of the programmes would decrease even further.

Table 13: Proposed caseload and estimated coverage of eligible population

Programme	Caseload	Coverage
PWDLH – first tranche	3,367	11.8% ¹²
PWDLH – second tranche	7,616	1.8%
ECT	67,700	47.2%
COVID-19 SSN	65,000	23.2%

Source: Authors, using 2018 Integrated Household Survey data with population size updated based on population growth. Note: ^a Coverage is computed as caseload over the number of households identified as eligible according to the programme targeting criteria as replicated in the data.

Table 14 compares the annual value of the three social protection interventions with the national poverty line and with the consumption expenditure at baseline for the bottom 25% of the population in rural and urban areas.

Table 14: Social protection measures simulated

Measure	Total annual value (SLL/GBP)	% of annual national poverty line (household level)	% of annual consumption expenditure of bottom 25% of households at baseline	
			Rural	Urban
PWDLH (cash only)	250,000 / £18	1.2%		2%
ECT	1,309,000 / £96	6.2%		11%
COVID-19 SSN	2,659,000 / £195	12.5%	23%	23%

Source: Authors, using the 2018 Integrated Household Survey data.

To assess the adequacy of the interventions we looked at the predicted additional needs of households falling into poverty and of those already poor at baseline that fall deeper into poverty. Specifically, we computed the average shortfall from the national poverty line for households falling into poverty because of the shock and the additional shortfall from the poverty line for households that were already poor at baseline but fell deeper into poverty because of the shock. Table 15 focuses on the situation of households in the short term and shows that the poverty gap among the newly poor is overall 28%, while for households that were already poor at baseline the poverty gap widened by 13%. In urban areas, it is found that the increase in the poverty gap for baseline poor is equivalent to the poverty gap among

¹² It is difficult to know how many people with disability there are in the country. In the final report on the PWDLH from NaCSA, it states that 11.79% of people with disability were covered (they note that in 2015 there were an estimated 93,129 people with disability in the country). The 2015 assessment was a disability assessment and likely captured more people due to the data collection methods.

the newly poor, indicating that households that were close to the poverty line at baseline have been affected similarly to households that were already poor.

Table 15: Average shortfall from the poverty line for individuals falling into poverty because of COVID-19 and additional shortfall for those falling deeper into poverty

	Newly poor			Baseline poor		
	All	Rural	Urban	All	Rural	Urban
Short term	28%	22%	30%	13%	9%	24%

Source: Authors, using the 2018 Integrated Household Survey data.

Next, we compare the annual monetary value of the average shortfall from the poverty line with the total annual value of the urban emergency transfers proposed. The percentage of the annual shortfall covered by the transfer gives a measure of the generosity of each transfer and an estimate of the additional household needs due to COVID-19 shock that are not met by social protection. Table 16 shows that in urban areas the PWDLH covers approximately 4% of the additional amount needed to bring households' consumption to its pre-shock level, while the ECT narrows the gap by 21%.

Table 16: Average shortfall from the poverty line for individuals falling into poverty because of COVID-19 and for those falling deeper into poverty in urban areas

	% of shortfall covered for newly poor
PWDLH	4%
ECT	21%

While the implementation of the SSN has been adapted to accommodate the emergency, the COVID-19 SSN's objectives are not strictly related to the emergency. This means that its value should be such that it helps narrow the gap between consumption poverty and the poverty line. Table 17 therefore compares the amount provided by the COVID-19 SSN to the amount needed to bring the new and baseline poor out of poverty. It shows that while for newly poor households the COVID-19 SSN might cover close to 50% of the amount needed to escape poverty, for the baseline poor the value of the transfer covers less than one-third of the poverty gap.

Table 17: % of shortfall (additional shortfall) from the national poverty line for individuals falling into poverty (falling deeper into poverty) because of COVID-19 covered by each programme

	% of shortfall covered for newly poor			% of shortfall covered for baseline poor		
	All	Rural	Urban	All	Rural	Urban
COVID-19 SSN	45%	57%	42%	28%	29%	25%

5 Conclusions

Despite the Sierra Leone social protection sector being relatively nascent, the GoSL was able to respond to COVID-19 quickly. Our microsimulation indicates that all programmes have had an impact on mitigating the impact of the pandemic on poverty, albeit to varying degrees depending on the scenario: short-term, transition, or recovery. However, given the high level of poverty in the country pre-COVID-19, and our estimated dramatic impact of the pandemic on the poverty headcount, the implemented interventions are expected to fall short in terms of coverage and adequacy.

6 Limitations

Our approach intended to provide a rapid way to assess the impact of current and potential social protection response to COVID-19 on poverty. There are some key limitations to the approach:

- Our model relies heavily on exogenous parameters that provide an indication of the expected short- and longer-term effects of the crisis on the various sectors of the economy. Although informed as much as possible by existing data, the assumptions used in the microsimulation models are inevitably somewhat arbitrary given how much uncertainty exists about how lockdown experiences will ultimately translate into experiences during COVID-19-induced recessions. The predictive power of the model therefore depends on the goodness and accuracy of these parameters.
- Our model does not account for substitution effects across goods, and for changes in consumption patterns due to the crisis nor for the role of savings that could reduce the impact on consumption.
- Our model does not capture mobility on the labour market, whereby workers switch to more profitable sectors.
- Our model does not account for behavioural effects: in particular, those related to the adoption of negative coping strategies that could lead in the medium to long term to a decrease in consumption level and wellbeing.
- Our model relies on household-level income and consumption estimates and it is therefore not suitable for investigating issues of intra-household dynamics. This implies that the results cannot provide answers on the gender-specific impact of the pandemic.

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Annex A Simulation parameters

Table 18: Projected population by area of residence from the year of the survey

	2018	2019 ^a	2020 ^a	Growth ^b
Urban	3,217,272	3,285,848	3,354,720	1.04
Rural	4,432,882	4,527,367	4,622,263	1.04
Total	7,650,154	7,813,215	7,976,983	1.04

Notes: ^a Overall population size projections based on [Sierra Leone Population 2020 \(Demographics, Maps, Graphs\) \(worldpopulationreview.com\)](#); population projection by area estimated by keeping urban share constant from 2018. ^b Growth of population between 2018 and 2020.

Table 19: Real GDP *per capita* growth by sector

Sector	2018/19	2019/20 (forecasted pre-COVID-19)
Agriculture	1.03	1.05
Mining and quarrying	1.14	1.20
Manufacturing	1.02	1.03
Electricity	1.02	1.04
Water supply	1.02	1.05
Construction	1.02	1.05
Wholesale and retail	0.98	1.01
Hotels and restaurants	1.00	1.03
Transport storage	1.04	1.06
Communication	1.04	1.07
Finance, insurance	1.02	1.03
Real estate	1.00	1.02
Administration of public services	1.07	1.10
Other services	1.02	1.05
Education	0.94	0.96
Health	0.98	1.01
Non-profit institutions serving households	1.03	1.06
Overall	1.03	1.02

Source: Authors' calculations based on real GDP growth forecast in the 'Quick Action economic response programme (QAERP)' (Government of Sierra Leone) and based on official real GDP figures from Statistics Sierra Leone.

Table 20: Coverage of SSN by locality

Region	Locality	Coverage (no. of households)
Western Urban	Freetown	19,000
Southern Region	Bo City	2,500
North West	Port Loko	2,500
Eastern Region	Kenema	2,500
Northern Region	Makeni	2,500

Annex B Additional simulation results

Table 21: Headcount poverty impact of the various impact channels

Scenario	Extreme poor (US\$ 1.90)	National poverty line	Poor (US\$ 3.20)
<i>Baseline</i>	40.3	56.9	74.1
SHORT TERM			
Employment income	56.8	71.7	85.2
Overall income	57.2	71.9	85.5
Inflation	40.1	56.8	73.9
Inflation and employment income	56.6	71.5	84.9
<u>Overall</u>	56.9	71.7	85.1
TRANSITION			
Employment income	50.5	66.0	81.9
Overall income	50.6	66.1	81.9
Inflation	40.1	56.8	73.9
Inflation and employment income	50.3	65.7	81.6
<u>Overall</u>	50.4	65.7	81.7
RECOVERY			
Employment income	45.5	62.3	78.6
Overall income	45.6	62.1	78.7
Inflation	40.1	56.8	73.9
Inflation and employment income	45.4	62.0	78.4
<u>Overall</u>	45.6	61.8	78.4