



# POPULATION GROUP SIZE ESTIMATES, POVERTY PROFILE, AND CAPACITY TO PAY

A Secondary Analysis of the 2016 Cambodia Socio-Economic Survey to Inform Scenario Development for Health Insurance Coverage Expansion



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## JANUARY 2019

This publication was prepared by Robert Kolesar and Rebecca Ross of the Health Policy Plus project.

Suggested citation: Kolesar, R. and R. Ross. 2019. *Population Group Size Estimates, Poverty Profile, and Capacity to Pay: A Secondary Analysis of the 2016 Cambodia Socio-Economic Survey to Inform Scenario Development for Health Insurance Coverage Expansion*. Washington, DC: Palladium, Health Policy Plus.

ISBN: 978-1-59560-195-7

Health Policy Plus (HP+) is a five-year cooperative agreement funded by the U.S. Agency for International Development under Agreement No. AID-OAA-A-15-00051, beginning August 28, 2015. The project's HIV activities are supported by the U.S. President's Emergency Plan for AIDS Relief (PEPFAR). HP+ is implemented by Palladium, in collaboration with Avenir Health, Futures Group Global Outreach, Plan International USA, Population Reference Bureau, RTI International, ThinkWell, and the White Ribbon Alliance for Safe Motherhood.

This report was produced for review by the U.S. Agency for International Development. It was prepared by HP+. The information provided in this report is not official U.S. Government information and does not necessarily reflect the views or positions of the U.S. Agency for International Development or the U.S. Government.

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## Abbreviations

CI	confidence interval
CSES	Cambodia Socio-Economic Survey
CTP	capacity to pay
DHS	Demographic and Health Survey
GDP	gross domestic product
HEF	Health Equity Fund
HIV	human immunodeficiency virus
HH	household
HP+	Health Policy Plus
MOH	Ministry of Health
NSPPF	National Social Protection Policy Framework
NSSF	National Social Security Fund
OOP	out-of-pocket
PEPFAR	U.S. President's Emergency Fund for AIDS Relief
PPP	purchasing power parity
RGC	Royal Government of Cambodia
USAID	U.S. Agency for International Development
WTP	willingness to pay

## Summary

The Royal Government of Cambodia (RGC) has established the reduction of poverty, vulnerability, and inequality as explicit policy goals in its *National Social Protection Policy Framework 2016–2025* (NSPPF). The NSPPF aims to strengthen the social protection system to provide resilient protection from economic and financial vulnerability for all citizens, thereby promoting human development and stimulate economic growth. Aligning with the United Nations Sustainable Development Goals, the framework’s strategy includes the development and expansion of health insurance schemes to achieve universal coverage to protect all citizens.

To identify potential scenarios for the expansion of health insurance in Cambodia, the 2016 Cambodia Socio-Economic Survey (CSES) was analyzed. This work was undertaken by the Health Policy Plus (HP+) project, funded by the U.S. Agency for International Development (USAID) and the U.S. President’s Emergency Fund for AIDS Relief (PEPFAR), in support of the Cambodia Ministry of Economy and Finance, General Secretariat of the National Social Protection Council. More specifically, this work was undertaken to (1) define population groups and estimate sizes; (2) examine the poverty profile, with a focus on the second quintile—the near-poor population; and (3) estimate household (HH) capacity to pay a health insurance premium as well as HH financial healthcare expenditure. This paper is organized into six sections: this summary, background, methods, findings, discussion, and conclusion and next steps.

## Background

### Health Insurance Landscape

The Cambodian healthcare payment landscape currently includes a patchwork of health insurance schemes. Civil servants’ and formally employed workers’ schemes are managed by the National Social Security Fund (NSSF) under the Ministry of Labor. The Health Equity Fund (HEF), established to provide free access to healthcare for the poorest of the poor, is operated by the Ministry of Health (MOH), with claims and payment verification as the responsibility of a semi-autonomous Payment Certification Agency. Free benefits under the HEF recently have been extended to some informal workers and selected populations (see below). The NSSF and HEF schemes are complemented by a limited number of Community-based Health Insurance schemes that offer voluntary health insurance to the informal sector. The MOH estimates that at this time, these schemes collectively cover about 4.7 million Cambodians, or 30 percent of the population; the MOH aims to increase coverage to 8.12 million, or 50 percent of the population, by 2020 (Bun, 2018).

### Health Equity Fund Extension

In October 2017, the RGC issued Prakas 404 LV, Implementation Health Care Scheme through Health Equity Fund System for Informal Workers and Provision of Additional Allowance for Female Workers when Giving Birth; it is a joint legal directive expanding HEF eligibility to informal workers. This regulation refers to informal workers as individuals with a signed employment contract for work of not more than eight hours a week—part-time, casual, or seasonal—and who are registered with the NSSF.<sup>1</sup> The RGC has not yet issued more detailed guidance relating to the definition of these terms or eligibility for HEF

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<sup>1</sup> In addition, Prakas 404, Chapter 2, Article 11, specifies that all employers of informal workers must have a written contract, and Chapter 1, Article 9 states that the employer is responsible for registering the employee with NSSF.

enrollment. In addition, special category beneficiaries recently have been deemed eligible under other directives issued by the Ministries of Labor (December 2017) and Health (January 2018). These beneficiaries include commune council members, village chiefs, deputy village chiefs, professional sport practitioners, and cyclo drivers.

## Toward Universal Health Coverage

As noted above, the NSPPF includes the development and expansion of health insurance schemes to achieve universal coverage. Progressive realization is a guiding principle for countries on their own path to universal health coverage (Baltussen, 2017). The best way to expand coverage to more people raises numerous questions; thus, recommendations and policy decisions are best served by information and evidence. In the Cambodian context, it is important to understand the remaining coverage gaps vis-à-vis policy goals. For example, decision-makers may ask: How many people do not yet have a coverage mechanism? Are the current expansion efforts focused on those most vulnerable? How many informal workers are already eligible for coverage under the recent HEF expansion? Finally, with the expressed goal of reducing inequality, vulnerability, and poverty, what groups are the most vulnerable, and can they even afford to pay premiums? If so, how much can they pay?

This analysis was undertaken to inform scenario development and quantify key modeling parameters to support decision making for the expansion of health insurance coverage. More specifically, this report aims to accomplish the following:

1. Present the population structure, including population group size estimates and stratification by residence and wealth quintile
2. Examine the poverty profile, with a focus on the second quintile—the near-poor population
3. Estimate HH capacity to pay a health insurance premium and financial expenditure on healthcare

## Methods

### Data Source

This study analyzed 2016 CSES data provided by the Ministry of Planning’s National Institute of Statistics. This survey is a nationwide representative sample that includes questions asked for the HH and individual HH members. The sampling methodology is described in the 2014 CSES report. The 2016 data set contains records for 3,839 HHs and 11,359 individual working-age adults. All data management and analysis was completed using Stata 15. Figures were prepared using Stata 15 and Microsoft Excel 2016.

Data were winsorized to bring income values from below the first percentile to the first percentile and from above the 99th percentile down to the 99th percentile. This adjustment limits the influence of extreme outliers in the analysis (Ghosh and Vogt, 2012). The application of this technique reduced the difference between the mean and median estimates for HH monthly disposable income and expenditure (see Annex 3). It improved the “representativeness” of mean values while enabling the application of sampling weights.

## Variables Employed

### Employment Group Classification

To the degree possible, employment groups were defined to correspond to health scheme coverage eligibility: part-time, seasonal, full-time employees, and government (e.g., civil servants and commune/village chiefs). This analysis defines part-time work as any employee who reported working more than zero hours, but less than 40 hours per week; this range is inclusive of individuals reporting employment of less than eight hours per week.<sup>2</sup> In relation to casual workers, defined as someone who has no guaranteed hours of work, note that this group is more an agreement type than an income category. As casual workers cannot be identified or differentiated in the CSES data, they are not presented as a separate group. This paper adopts the CSES definition of seasonal work, which is work done part of the year, with the same job reoccurring every year. Finally, this analysis considers farmers and fishermen (hereafter referred to only as farmers), and the self-employed as separate informal sector employment groups. The four informal sector sub-groups, along with their descriptions, are summarized in Table 1.

### Box 1. Key Definitions

**Wealth quintiles** are equal-sized segments of a population, each representing one-fifth, or 20 percent. The first quintile represents the lowest fifth of the data (1 percent to 20 percent), or the poor; the second quintile represents the second fifth (21 percent to 40 percent), or the near-poor; the third quintile represents the third fifth (41 percent to 60 percent), or the middle; the fourth quintile (61 percent to 80 percent) represents the upper-middle, and the fifth quintile (81 percent to 100 percent) represents the richest.<sup>a</sup>

**Disposable income** refers to income after deduction of taxes and other mandatory charges. In contrast, discretionary income is disposable income less spending for necessities (i.e., rent, health insurance, food, and transportation).<sup>b</sup>

**Purchasing power parity (PPP)** is a conversion factor or effective exchange rate that represents the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as 1 U.S. dollar (US\$1) would buy in the United States.<sup>c</sup>

<sup>a</sup> [www.investopedia.com/terms/q/quintile.asp](http://www.investopedia.com/terms/q/quintile.asp)

<sup>b</sup> [www.investopedia.com/terms/d/disposableincome.asp](http://www.investopedia.com/terms/d/disposableincome.asp)

<sup>c</sup> [data.worldbank.org/indicator/PA.NUS.PRVT.PP](http://data.worldbank.org/indicator/PA.NUS.PRVT.PP)

**Table 1. Informal Sector Employment Sub-Groups**

Sub-group	Description
<b>Part-time</b>	Inclusive of all individuals working less than 40 hours per week.
<b>Seasonal</b>	Work done part of the year, with the same job reoccurring every year. As per the CSES, examples of seasonal work include construction, tourism, and salt field workers.
<b>Farmers and fishermen</b>	The CSES excludes farming and fishing from seasonal work.
<b>Self-employed</b>	The CSES defines self-employment as non-agricultural economic activities. This definition includes work related to the sale of products and byproducts from personal production; charges for repair services; other professional services; service charges and commissions; resale of goods/products; board and lodging; sales and services for hotels and restaurants; transportation services (i.e., moto, etc.); recreation and cultural services; other community services; social and personal services; and any other activity.

<sup>2</sup> Due to the limited number of working-age adults reporting being an employee and working less than eight hours in the past week, we collapsed this category into “part-time.”

We reviewed the CSES master survey questionnaire to establish inclusion criteria for identifying employment groups among adults. Working-age adults (ages 15–65 years old) were assigned to one of eight employment groups: not active, part-time, seasonal, farmers, self-employed, employees, government, and employers. “Not active” includes those who had no report of a main occupation or economic activity, or reported working on their own account, as an unpaid family worker, or other, but did not report working any hours in the previous seven days and did not identify their most recent employment as seasonal. “Part-time” are those workers who reported being an employee and working less than 40 hours in the past seven days. “Farmers” (and fishermen) are those who identified that the farm or fish products they produced in the last seven days in their main economic activity were mainly or only for sale. “Self-employed” are those who reported their main occupation or economic activity as working on their own account, as an unpaid family worker, or other, and reporting working hours during the past week, exempting farmers as defined here. “Employees” are those reporting any non-government employment and working at least 40 hours in the past seven days. “Seasonal” employees are those who identified their current or previous employment (within the past 13 months) as seasonal. “Employers” were those who identified themselves as such; these individuals were excluded from further analysis due to their small number (<1 percent of respondents). Income/revenue categories with corresponding CSES questions and inclusion conditions are detailed in Annex 1.

## Methodology

Vulnerability group sizes for pregnant women and disabled were estimated by applying 2014 Demographic and Health Survey (DHS) proportions for those groups to 2018 population projections (see Figure 1). Vulnerable age groups (i.e., children under five years and seniors over 65 years) were taken directly from 2018 population projections.

The author calculated the food poverty line, representing subsistence expenditure, or the minimum resources required to eat, from the survey data, following the method described by Xu et al. (2003a, 2003b). This approach uses the mean food expenditure of HHs whose food share of total expenditure was in the 45 to 55 percentile range. This value was adjusted for HH size to account for economies of scale because per capita food cost typically decreases as the number of people in the HH increases. A coefficient was calculated using the following fixed effects regression model.

$$\ln food\_expenditure_{hh} = \ln \beta_0 + \beta_1 \ln hhsize_{hh} + \varepsilon$$

The size for each HH was raised to the power of  $\beta_1$ .

This method adjusted the daily per capita international poverty line and the lower middle-income class poverty line using the Cambodia Purchasing Power Parity (2016) conversion factor for private consumption (1US\$ PPP = 1,643.3 Cambodian Riel) (Deaton, 1992). Local currency figures were converted to U.S. dollars using the standard CSES exchange rate of 4,100 Cambodian Riel = 1US\$. These poverty metrics were used as benchmarks for wealth comparison and applied to estimate capacity to pay.

Monthly capacity to pay (CTP) at the HH level was calculated using three methods. Method 1 used disposable income net the World Bank low-middle class poverty line, adjusted for PPP and converted back to US\$. Method 2 used total HH consumption expenditure as a proxy for effective income net the food poverty line as the estimate for subsistence expenditure. This method was proposed by Xu et al. Method 3 used total HH consumption expenditure as a proxy for effective income net the Brookings Institution’s low-middle class poverty line of 250 percent of the poverty line (i.e., the food poverty line). These methods are expressed as equations below.



Method 1:  $CTP_{hh} = \text{Disposable income}_{hh} - \text{Low-middle class poverty line}_{hh}$

Method 2:  $CTP_{hh} = \text{Effective income}_{hh} - \text{Food poverty line (subsistence expenditure)}_{hh}$

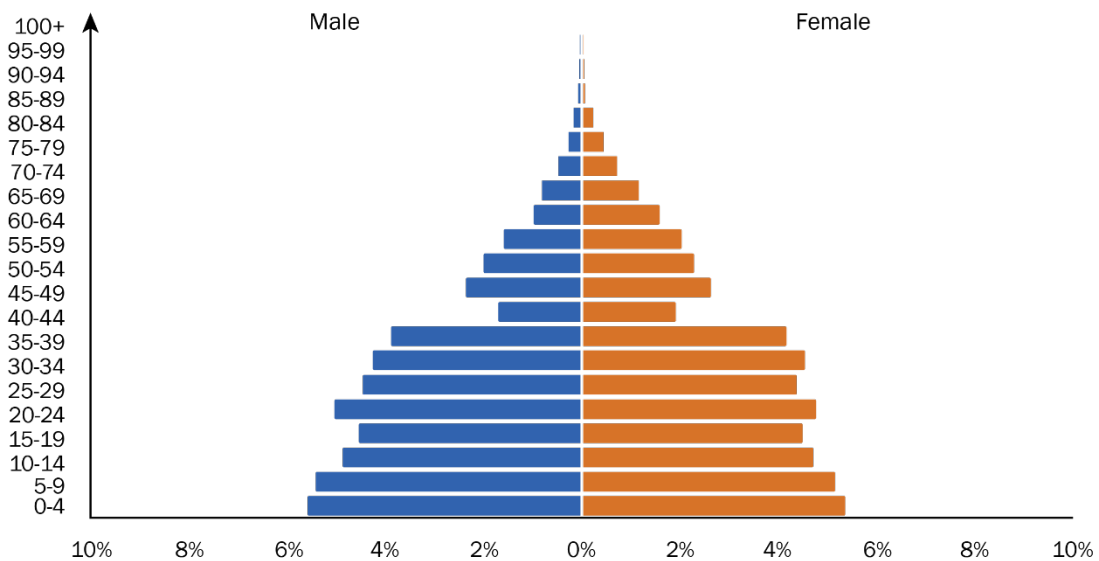
Method 3:  $CTP_{hh} = \text{Effective income}_{hh} - \text{Low-middle class poverty}_{hh}$

## Findings

### Population Structure, Groups, and Proportions

This section presents the population structure and estimated population proportions by residence, vulnerability group, and employment group. Figure 1 presents the 2018 population pyramid. Overall, children under age five represent 11 percent of the population, or nearly 1.8 million children; school-aged children ages five to 15 represent 20.3 percent, or about 3.3 million; working-age adults represent 63.4 percent of the total population, or approximately 10.35 million adults; and seniors over age 65 represent 4.6 percent, or about 751,000 people.

Figure 1. Cambodia 2018 Population Pyramid



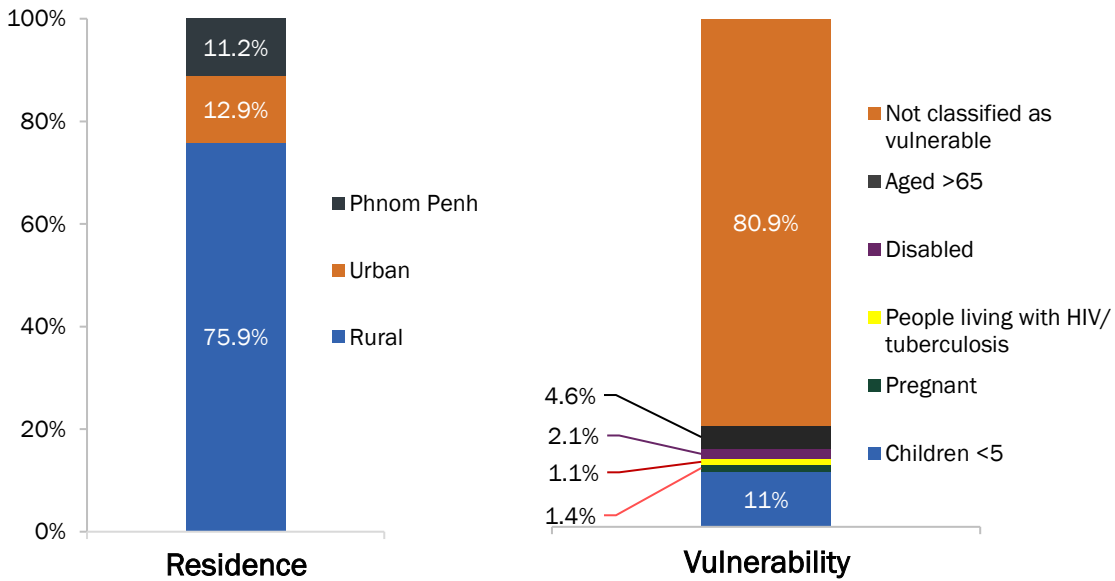
Cambodia - 2018  
Population: 16,323,953

Source: "Cambodia 2018," n.d.

Next, the analysis stratified the total population by the following: residence (urban, rural, and Phnom Penh), vulnerability (children under age five, pregnant women, people living with HIV, the disabled, and seniors over age 65), and adult employment (non-active, part-time, seasonal, farmers/fishermen, self-employed, employees, and government workers).

Figure 2 presents the population proportion estimates by residence and vulnerability group. Following estimates from the 2016 CSES, more than three-quarters of Cambodia's population reside in rural areas. About 11.2 percent of the population lives in Phnom Penh; 12.9 percent lives in other urban centers.

**Figure 2. Population Proportion Estimates, by Residence and Vulnerability Group**



Sources: “Cambodia 2018;” NIS, 2015; WHO, 2018.

Vulnerability group estimates were constructed by applying DHS 2014 population proportion estimates to 2018 population estimates. Collectively, the vulnerable population amounts to 20.3 percent of the total population, or about 3.3 million people. This estimate includes about 1.8 million children under age five (11 percent), 230,000 pregnant women (1.4 percent), 188,000 people living with HIV/tuberculosis (1.2 percent), 343,000 disabled people (2.1 percent), and 751,000 people over the age of 65 (4.6 percent).

**Figure 3. Population Proportion Estimates among Working-Age Adults, by Employment Group**

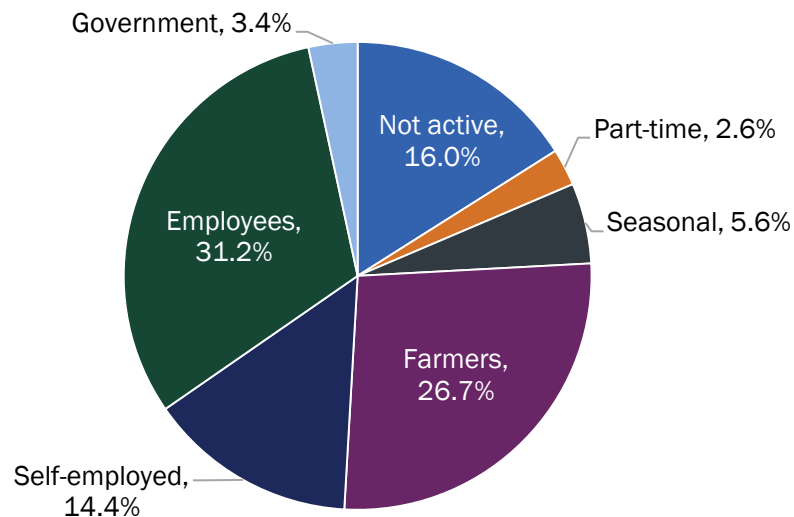


Figure 3 shows population proportion estimates among working-age adults by employment group. About 16 percent of working-age adults currently are not working. Part-time and seasonal workers (those explicitly covered under Prakas 404), are estimated to account for 8.2 percent, or about 850,000. Farmers (and fishermen) constitute 26.7 percent, or nearly 2.76 million; the self-employed represent 14.4 percent, or nearly 1.5 million; employees and

workers constitute 31.2 percent, or about 3.2 million; and government workers represent 3.4 percent, or approximately 352,000.

## Poverty Profile by Population Group

It is important to note that HH income and expenditure are continuous, such that incomes just above and below each quintile cut-off point (i.e., 21 percent, 41 percent, 61 percent, etc.) generally are very similar, and segmentation into one quintile does not necessarily change an HH's economic position. This issue can obfuscate income fluctuations, which particularly affect the informal sector. Figure 4 illustrates the distribution of disposable income (shown in red) by fraction of the data or quartiles. This figure shows that 4 percent of HHs reported a negative income<sup>3</sup> and a gradual increase in disposable income across quintiles 1–4. The figure also highlights the very high HH income among the top 10 percent of HHs relative to all others. This situation yields a Palma ratio of 3.54, meaning that HHs in the highest decile have more than 3.5 times the amount of disposable income of the poor and near-poor combined (those HHs under the 40th percentile).

**Figure 4. Distribution of Monthly Disposable HH Income and Expenditures, in US\$**

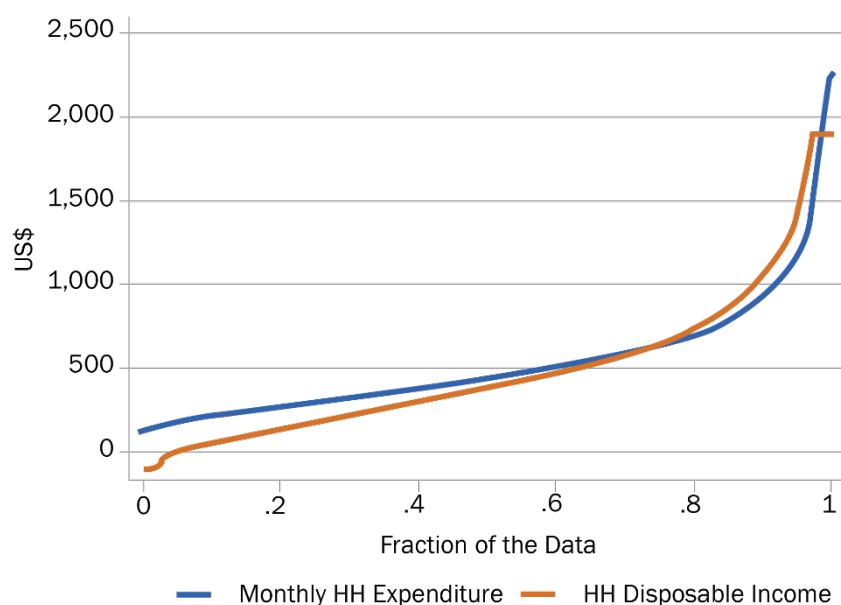


Figure 4 also shows the distribution of HH expenditure across quintiles. Expenditure (shown in blue) tracks closely with, but is higher than, disposable income (shown in orange) until about the 70th percentile. In most HH surveys, income is commonly under-reported—respondents may not wish to reveal their true income for various reasons, such as attracting attention from tax authorities. In addition, it is also recognized that income data is more vulnerable to random shocks. Thus, over time, the variance of current expenditure is smaller than the variance of current income. For these reasons, expenditure data are generally considered more reliable than income data (World Bank, 2002; Xu, 2003b; Bouis, 1994; Deaton, 1992; Xu, 2003a; National Institute of Statistics, Ministry of Planning, 2015).

<sup>3</sup> Negative income is attributable primarily to no depreciation of investments, such as tools and animals, which results in a rather large number of households with negative income (NIS, 2015, p. 91).

**Figure 5. Average Monthly HH and Expenditure, by Wealth Quintile**

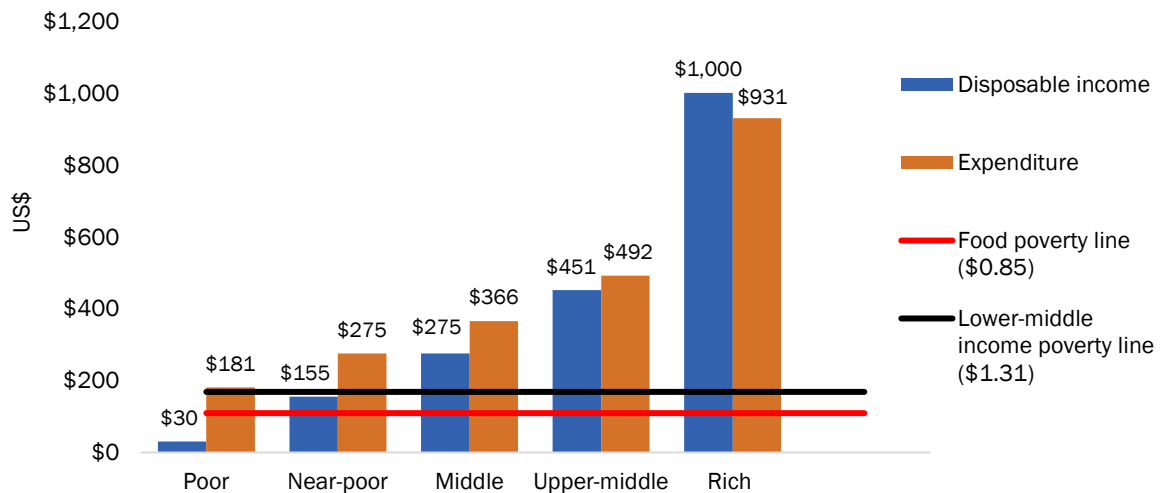
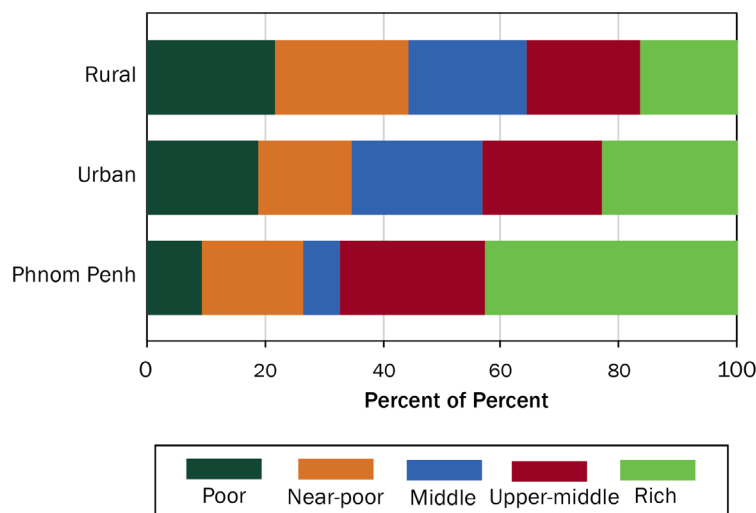


Figure 5 presents average monthly HH disposable income and expenditure by wealth quintile, benchmarked against the food poverty line of US\$0.85 per person per day and the World Bank’s lower-middle income class poverty line of US\$1.31. Among the poorest quintile, disposable income is below the food poverty line, and expenditure is just above the lower-middle income poverty line. Among the second quintile, or near-poor, disposable income exceeds the food poverty line but is under the lower-middle income poverty line. Expenditure is just above the lower-middle income poverty line. Disposable income among the richest quintile is about 6.5 times higher than for the near-poor.

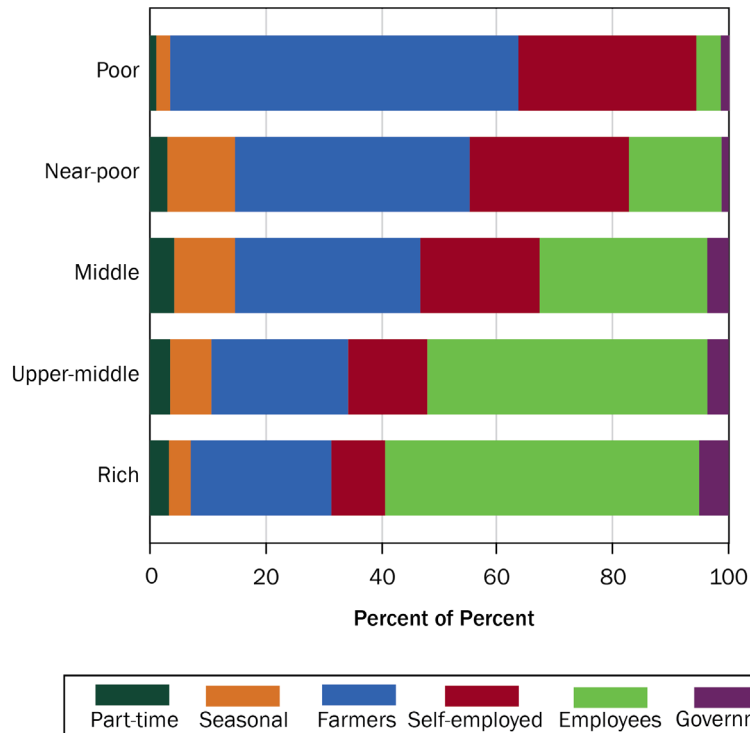
Figures 4 and 5 above provide an overview of the wealth distribution benchmarked to the food poverty line and lower-middle income poverty line. Figures 6–8 below illustrate the distribution of wealth by residence and employment category. “Percent of percent” refers to the proportion of the (y-axis) category by each category (wealth or employment) shown in the legend.

**Figure 6. Household Residence, by Effective Income Wealth Quintile**



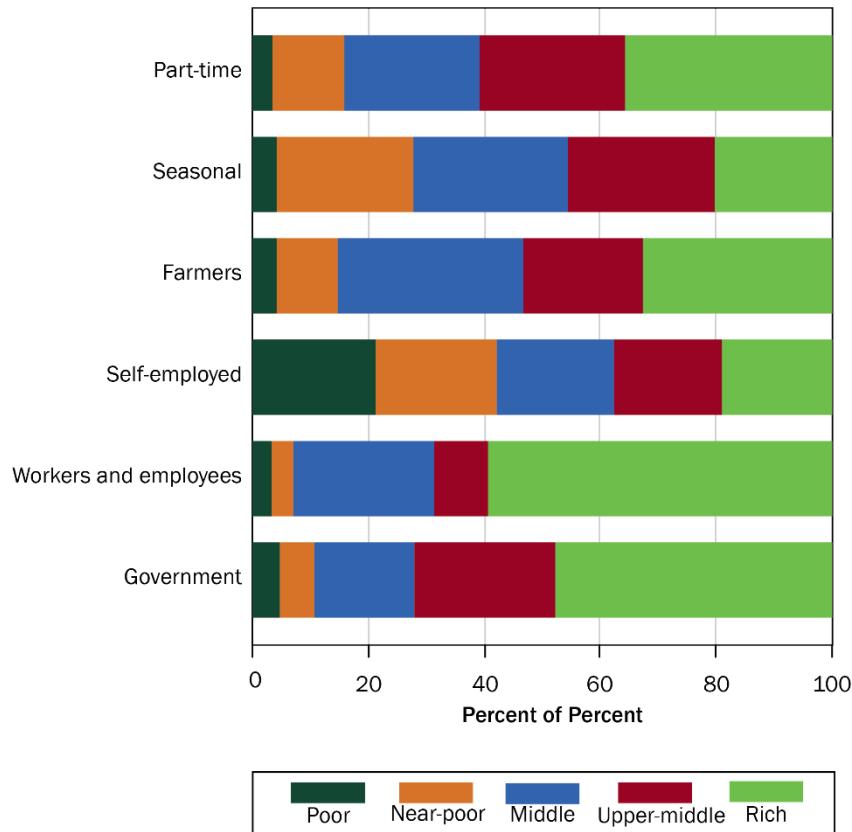
A review of wealth quintiles by residence highlights the wealth concentration among HHs in Phnom Penh, where nearly 85 percent of HHs are in the middle-income quintile or higher (see Figure 6). Only 15 percent of the HHs in the capital are classified as poor or near-poor. The rural areas, representing about 75.9 percent of the population, have a higher concentration of the poor and near-poor, collectively representing 44.3 percent of rural HHs.

**Figure 7. Household (Effective Income) Wealth Quintile, by Employment Category among Active Working Adults**



More than 90 percent of the working poor are either farmers (60 percent) or self-employed (30.5 percent). These employment groups decrease as a proportion of adult workers as the wealth quintile increases: 67.7 percent among the near-poor (40.6 percent farmers and 27.1 percent self-employed); 52.4 percent among the middle quintile (32 percent farmers and 20.4 percent self-employed); 37.3 percent among the upper-middle (23.6 percent farmers and 13.8 percent self-employed); and 33.5 percent among the rich (24.1 percent farmers and 9.4 percent self-employed). Inversely, the proportion of full-time employees increases with wealth quintile: 4.2 percent among the poor; 15.9 percent among the near-poor; 29 percent among the middle quintile; 48 percent among the upper-middle; and 53.9 percent among the rich.

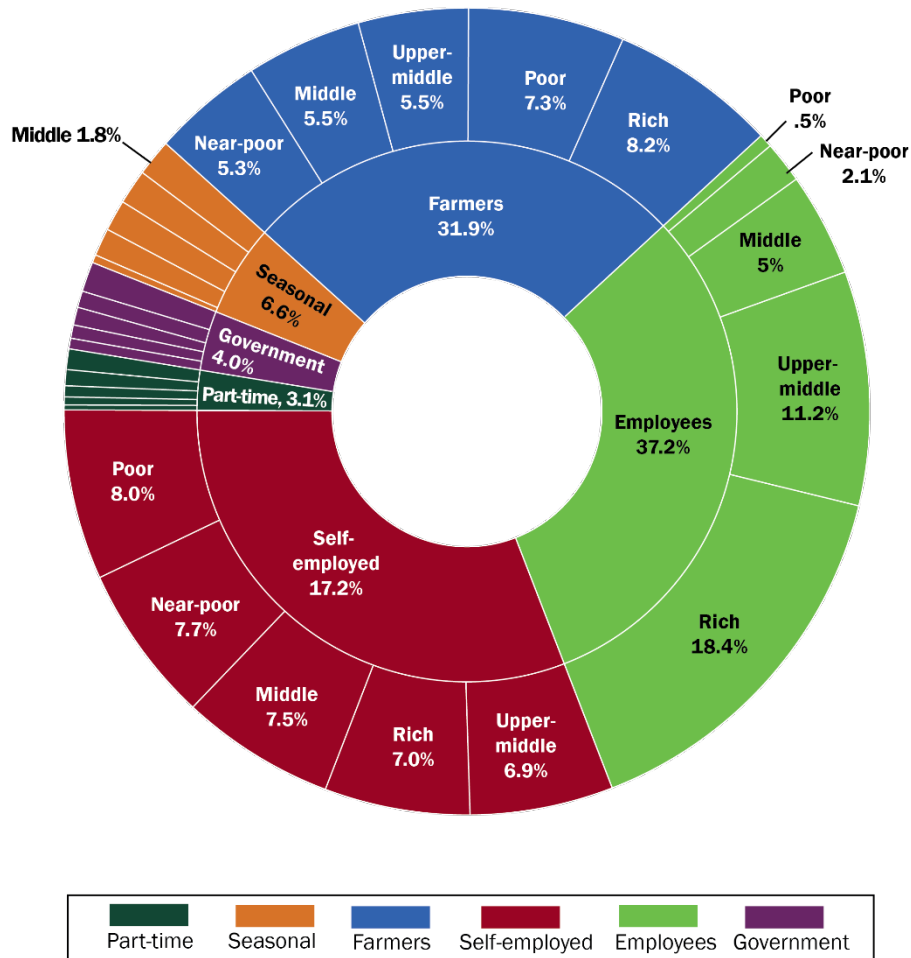
**Figure 8. Employment Category among Active Working-Age Adults, by Household Effective Income Wealth Quintile**



By reviewing HH employment category by wealth quintile (excluding non-active working-age adults) we observe that about 90 percent of employees and government workers live in HHs belonging to the top three wealth quintiles, with more than 49.6 percent and 47.5 percent, respectively, belonging to the top quintile. By contrast, 39.7 percent of farmers and 42.4 percent of the self-employed live in poor or near-poor HHs. The proportion of workers reporting part-time work increases with HH wealth quintile: only 3.8 percent of poor and 12.4 percent of the near-poor report part-time work, compared to 23.3 percent of the middle quintile, 25.2 percent of the upper-middle, and 35.4 percent of the rich. Seasonal employment is highest among the near-poor (23.4 percent), the middle (26.8 percent), and the upper-middle (25.4 percent) HHs.

Figure 9 shows the relative population proportions of active working-age adults by employment group, segmented by wealth quintile. This approach enables the identification of vulnerability within employment groups, particularly those not presently having a health insurance coverage option. Near-poor farmers are estimated to comprise 5.3 percent of the population; near-poor self-employed are estimated to constitute 7.7 percent of the population. These percentages represent about 1.13 million economically active adults, with an estimated total HH population of 4.9 million.

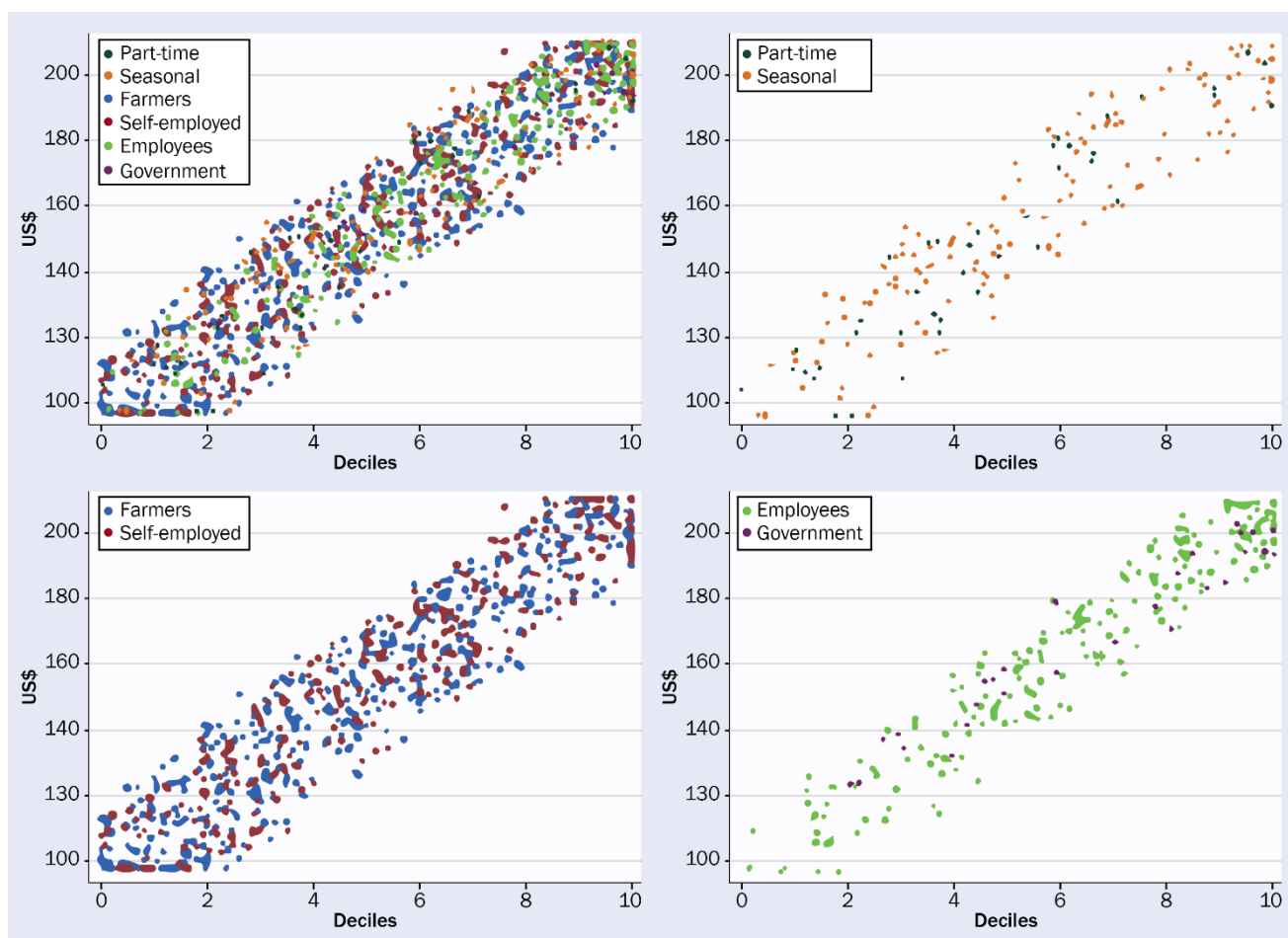
Figure 9. Population Proportions, by Employment Group and Wealth Quintile, among Active Working-Age Adults



### Profile of the Near-Poor

Figure 10 shows the distribution of HH disposable income among the second quintile (the near-poor), by employment group, collectively, and by employment groupings (i.e., part-time and seasonal; farmers and self-employed; and employees and government workers). Markers are weighted according to HH size. Part-time and seasonal workers are evenly but thinly distributed across the quintile. Farmers and the self-employed, representing more than 67.7 percent of the quintile, are evenly but more densely distributed across the quintile.

**Figure 10. Distribution of Monthly HH Disposable Income Among the Near-Poor, by Employment Group**



In contrast, employees and government workers are sparsely distributed, but with a higher concentration toward the higher deciles of the quintile. These figures illustrate that the near-poor/vulnerable group is composed predominately of farmers and self-employed, compared to part-time and seasonal workers, the employed, and government workers. In addition, some non-uniformity is displayed in the distribution of employees and government workers across the quintile.

## Household Capacity to Pay and Financial Contribution to Healthcare

The HH capacity to pay was calculated using the three methods described in Section III. All three approaches net subsistence expenditure from income. Method 1 is based on disposable income net the World Bank lower-middle income class poverty line. Methods 2 and 3 use HH expenditure as a proxy for effective income. Method 2 deducts the food poverty line; Method 3 nets the lower-middle class poverty line.

Table 2 presents the daily and monthly poverty line estimates used as proxies for subsistence expenditure. The analysis adjusted World Bank estimates using PPP factors and reconverted them into US\$. To bring the poverty lines, defined at the individual level, to the HH level, an average HH size of 4.3 was applied. The World Bank's international poverty line (US\$1.90 PPP) per person per day is included for comparison with the food poverty line calculated from the data set. The Brookings Institution lower-middle class poverty line was calculated at 250 percent of the population-specific (food) poverty line.



**Table 2. Cambodia HH Subsistence Expenditure Daily and Monthly Estimates, in US\$**

Proxy Measures of Subsistence Expenditure	Daily <sup>1</sup>	Monthly	Method Reference
International poverty	3.33	100.09	World Bank
Food poverty	3.65	109.40	Xu et al.
Lower-middle income class	5.61	168.58	World Bank
Lower-middle class poverty	9.13	273.50	Brookings Institution

<sup>1</sup> The reference rates presented here were calculated for an average HH size of 4.3, calculated from the 2016 CSES.

**Table 3. Monthly HH Capacity to Pay (CTP) Estimates, by Wealth Quintile and Residence, in US\$**

Population Segment	Mean Disposable Income	CTP Method 1	Mean Effective Income	CTP Method 2	CTP Method 3
<b>Wealth Quintile</b>					
Poor	30.31	-	181.28	102.34	-
Near-poor	154.89	6.66	275.38	166.81	15.45
Middle	275.16	115.07	365.57	248.83	86.18
Upper-middle	451.42	273.23	492.19	373.43	206.29
Rich	1000.15	800.85	930.56	806.33	631.96
<b>Residence</b>					
Rural	343.99	175.89	407.68	297.98	133.95
Urban	426.24	252.74	563.16	451.66	284.97
Phnom Penh	602.37	436.99	624.51	516.40	354.24
Total Population	383.20	213.82	449.15	339.39	175.28

Table 3 presents mean CTP estimates by wealth quintile and residence, using the three methods described above. Overall, the near-poor and rural residents have the least capacity to pay. Method 3 represents the average “surplus” of HH effective income over the low-middle class poverty line. On average, near-poor HHs surpass this threshold by \$15.45 per month, representing 5.6 percent of their effective income. In contrast, middle-income HHs on average surpass this threshold by (\$86.18), nearly six times this amount—equating to 23.6 percent of their average effective income. CTP among the richest quintile amounts to \$631.96 per month, or 68 percent of their effective income. CTP among rural HHs is just 47 percent compared to the average urban HH, and 37.8 percent compared to the average Phnom Penh HH.

Table 4 presents the average one-month healthcare expenditures by wealth quintile and residence. The overall average HH expenditure amounts to \$28.35. Among HHs reporting health expenditure (47.5 percent), the average is \$55.97. The average HH expenditure does not vary significantly across wealth quintiles. However, among HHs reporting health expenditure, point estimates trend lower (but are not statistically different) for poor and near-poor HH expenditures—\$35.56 and \$43.45, respectively—compared to the upper three wealth quintiles (\$44.37, \$106.97, and \$50.59, respectively). We note the point estimates for the upper-middle wealth quintile population segment are about double their middle and

upper wealth quintile counterparts. However, the associated 95 percent confidence interval (CI) ranges (US\$8.21 to \$100.51, and \$16.30 to \$197.63) reveal that they are not statistically different. These CI ranges are broad because there is more heterogeneity of healthcare expenses for that group. Among the near-poor, the average HH expenditure among HHs reporting health expenditures is 28.1 percent of disposable income and 15.8 percent of total expenditure. These estimates do not include transport costs. Out-of-pocket (OOP) health expenditures exceeding 25 percent of total HH income or expenditure are considered catastrophic (World Health Organization, 2018).

Among HHs reporting healthcare expenditures, the point estimates for such expenditures in Phnom Penh (\$41.12) are lower than but not statistically significantly different from estimates for rural (\$57.42) and other urban (\$50.28) areas.

**Table 4. Average One-Month HH Healthcare Expenditures by Wealth Quintile and Residence, in US\$**

Population Segment	Average HH Expenditure	95% CI	Average HH Expenditure among HHs with Health Expenditure	95% CI
<b>Overall</b>	28.35	18.64–38.07	55.97	37.28–74.66
<b>Wealth Quintile</b>				
<b>Poor</b>	18.72	13.18–24.26	35.56	25.63–45.48
<b>Near-poor</b>	23.68	12.33–34.03	43.45	25.14–61.75
<b>Middle</b>	22.78	16.24–29.32	44.37	32.37–56.36
<b>Upper-middle</b>	54.36	8.21–100.51	106.97	16.30–197.63
<b>Rich</b>	22.23	14.60–29.86	50.59	34.48–66.70
<b>Residence</b>				
<b>Rural</b>	31.18	15.64–36.16	57.43	35.60–79.27
<b>Urban</b>	25.90	15.64–36.16	50.28	29.82–70.74
<b>Phnom Penh</b>	8.59	4.41–12.76	41.12	26.34–55.90

Note: Expenditure was aggregated to the HH level and averages were weighted by HH.

Excepting average HH expenditure in Phnom Penh, all 95 percent confidence intervals overlap for each population segment. Thus, those point estimates are statistically the same. Average HH expenditure in Phnom Penh (\$8.59) show a significant difference when compared to expenditure among HHs reporting health expenditure, suggesting similar (but lower) OOP payments in Phnom Penh; however, the proportion of HHs seeking care are lower compared to other urban and rural areas.

Although it is not possible to make a direct comparison between the CSES and DHS, it is notable that the 2014 DHS estimated healthcare costs among those seeking healthcare in the past 30 days to be \$41.76 in urban areas and \$34.95 in rural areas. The DHS report noted that “the urban-rural difference in health care costs has narrowed considerably due to a decline in costs in urban areas. In urban areas average health care costs decreased from \$74.79 in 2010 to \$41.76 in 2014, and in rural areas costs increased from \$23.55 to \$34.95 over the same period.” Results from this study suggest that this convergence of costs between urban and rural areas has continued since 2014.

## Discussion

Through its NSPPF, the RGC has explicitly defined the reduction of poverty, vulnerability, and inequality as a national policy goal. The recent expansion of HEF to include some informal workers has the potential to expand coverage to about 850,000 people. However, approximately 8.8 million Cambodians do not yet have a potential health insurance coverage mechanism. Collectively, vulnerable groups, defined as children under age five, pregnant women, the disabled, people living with HIV/TB, and the elderly, constitute 20.3 percent of the population, or about 3.3 million people. In addition, school-aged children ages five to 15 years represent 20.3 percent of the population, or about 3.3 million Cambodians. An employment-based approach, if applied to a worker's HH, could mitigate this coverage gap. In addition, farmers (26.7 percent) and the self-employed (14.4 percent) are estimated to comprise about 41.2 percent, or 4,260,533 adults (inclusive of non-active adults). Currently, there is no explicit health insurance coverage mechanism for these groups.

An examination of the second quintile—near-poor HHs—reveals that this group predominately (67.2 percent) comprises farmers and self-employed—two employment groups with no coverage mechanism. In addition, near-poor HHs, are, on average, just \$15.45 over the (monthly) middle-income poverty line. Considering the average one-month HH healthcare expenditure among the near poor is estimated to \$23.68, inclusion of this expense brings the average HH under the middle-lower class poverty line. Near-poor HHs are highly vulnerable, as one major financial setback can undermine their current economic position. In fact, if we consider only HHs that reported healthcare expenses, the average one-month expense increases to \$43.45. One study from Cambodia found that even relatively modest OOP health expenditures frequently cause indebtedness and can lead to poverty (Van Damme et al., 2004). In relation to financial risk protection, evidence from low and middle-income countries suggests that health insurance reduces OOP spending and the incidence of catastrophic payments (Escobar et al., 2010).

It is also noteworthy that although rural HHs have a lower CTP compared to their urban and capital counterparts, they are highly heterogeneous. Thus, premium exemptions or subsidies would likely need to be targeted strategically to ensure that the vulnerable are benefiting and premiums can be collected among those who can afford them. One possible approach to expansion would be to cross-target exemptions, perhaps by residence and province, to reduce the administrative cost of premium collection in areas that surpass a minimum population proportion below the 40th percentile.

Finally, it is important to recognize the difference between CTP and willingness to pay (WTP). WTP for health insurance premiums can limit enrollment and coverage, thus reducing access to health services, particularly among lower-income quintile HHs (Dong et al., 2005), which in turn can undermine the equity of health. Premium exemptions and targeted subsidies can support the RGC's development policy objectives. A recently published systematic review of WTP for health insurance in low and middle-income groups found that the WTP for healthcare insurance among rural HHs was just below 2 percent of the GDP (gross domestic product) per capita. In Cambodia, 2 percent of GDP per capita equates to \$14.98 per year.<sup>4</sup>

The average one-month HH expenditure among rural HHs is \$31.18. Among those reporting a health expenditure, the amount is \$57.43, which may be considered the upper limit of an average rural HH's annual WTP.

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<sup>4</sup> GDP per capita (constant local currency unit [LCU])  $3,069,876/4100 = \$748.75 * 2\% = \$14.98$ .

## Conclusion and Next Steps

Cambodia has accumulated significant experience with its implementation of various health schemes and approaches. In addition, there is a wealth of data available to support decision-makers in defining their path forward. Universal health coverage expansion design should define a long-term vision, strategy, and timeline. The information and parameter estimates presented in this report are intended to support a consensus-building process to identify health insurance expansion options and scenarios that can enable coverage and cost modeling.

The RGC has established national policy goals to reduce poverty, vulnerability, and inequality. The progressive expansion of health insurance should align with these stated goals. Vulnerable groups are estimated to include 3.3 million people. In addition, the near-poor are economically vulnerable, and presently farmers and the self-employed have no coverage mechanism. The expansion of coverage to near-poor farmers and the self-employed would increase coverage by about 1.13 million individuals. These figures could be offset by expanding the employer-based scheme to cover HH members. Alternatively, costs could be offset by pooling funds from the employer-based scheme to pay for services for vulnerable individuals with an HH member enrolled in that scheme. For the near term, coverage and cost modeling for expansion of payment-exempt services should focus on the following six scenarios:

1. Vulnerable groups as individuals
2. Vulnerable groups as HHs
3. Near-poor farmers and self-employed as individuals
4. Near-poor farmers and self-employed as HHs
5. Vulnerable groups and near-poor farmers and self-employed as individuals
6. Vulnerable groups and near-poor farmers and self-employed as HHs

Other options for progressive expansion include targeting provinces with the highest concentrations of near-poor, or cross-targeting as noted above.

For the medium and long term, HHs belonging to higher-income quintiles are able to contribute to the cost of care. However, there is no clear mechanism by which to enforce premium payments among farmers and the self-employed. To advance solutions to this issue, the RGC could set up a competitive grant process by which bidders could propose different approaches to address the issue and award multiple small grants to demonstrate the results in selected geographic areas.

## References

Baltussen, R., M.P. Jansen, L. Bijlmakers, N. Tromp, A.E. Yamin, et al. 2017. “Progressive Realisation of Universal Health Coverage: What Are the Required Processes and Evidence?” *BMJ Global Health* 2(3): e000342. doi:10.1136/bmjgh-2017-000342.

Bouis, H.E. 1994. “The Effect of Income on Demand for Food in Poor Countries: Are our Food Consumption Databases Giving Us Reliable Estimates?” *Journal of Development Economics* 44(1): 199–226.

Bun, Samnang. 5–6 April 2018. “Development of Social Health Protection.” Presented at World Health Day.

“Cambodia 2018.” n.d. *PopulationPyramid.net: Population Pyramids of the World from 1950 to 2100*. Available at [www.populationpyramid.net/cambodia/2018/](http://www.populationpyramid.net/cambodia/2018/).

Deaton, A. *Understanding Consumption*. Oxford, Oxford University Press, 1992.

Dong, Hengjin, Bocar Kouyaté, John Cairns, and Rainer Sauerborn. 2005. “Inequality in Willingness-to-Pay for Community-based Health Insurance.” *Health Policy* (Amsterdam, Netherlands) 72: 149–56. 10.1016/j.healthpol.2004.02.014.

Escobar, M.L., C.C. Griffen, and R.P. Shaw. 2010. “The Impact of Health Insurance in Low- and Middle-Income Countries.” Washington DC: The Brookings Institution.

Ghosh, D., and A. Vogt. 2012. *Outliers: An Evaluation of Methodologies*, Presented at the 2012 Joint Statistical Meetings. August 1, 2012.

National Institute of Statistics (NIS), Directorate General for Health, and ICF International. 2015. *Cambodia Demographic and Health Survey 2014*. Phnom Penh, Cambodia, and Rockville, Maryland, USA: National Institute of Statistics, Directorate General for Health, and ICF International.

National Institute of Statistics and Ministry of Planning. October 2015. *Cambodia Socio-economic Survey 2014*, pp. 102–103. Phnom Penh Cambodia: National Institute of Statistics. Available at: <http://www.nis.gov.kh/nis/CSES/Final%20Report%20CSES%202014.pdf>.

Van Damme, W., L. Van Leemput, I. Por, W. Hardeman, and B. Meessen. 2004. “Out-of-Pocket Health Expenditure and Debt in Poor Households: Evidence from Cambodia.” *Tropical Medicine & International Health* 9(2).

World Bank. 2002. “Guidelines for Constructing Consumption Aggregates for Welfare Analysis, Living Standards Measurement Study Working Paper No. 135.”

World Health Organization (WHO). 2018. “Monitoring Sustainable Development Goals—Indicator 3.8.2.” Available at: [http://www.who.int/health\\_financing/topics/financial-protection/monitoring-sdg/en/](http://www.who.int/health_financing/topics/financial-protection/monitoring-sdg/en/).

WHO. 2018. “Number of People (All Ages) Living with HIV.” *Global Health Observatory Data Repository*. Available at <http://apps.who.int/gho/data/node.main.620?lang=en>.

Xu, K., D.B. Evans, K. Kawabata, R. Zeramdini, J. Klavus, et al. 2003a. “Household Catastrophic Health Expenditure: A Multicountry Analysis.” *The Lancet* 362(9378): 111–117.

Xu, K., J. Klavus, K. Kawabata, D.B. Evans, P. Hanvoravongchai, et al. 2003b. "Household Health System Contributions and Capacity to Pay: Definitional, Empirical, and Technical Challenges." Pp. 533–542 in *Health Systems Performance Assessment: Debates, Methods and Empiricism*, edited by Christopher J.L. Murray and David B. Evans. Geneva: World Health Organization.

# Annex 1. Health Insurance Coverage Mechanism, by Income Category, with Socio-Economic Survey Identification Questions

## A. Prakas 404 LV/Prakas NSSF

Income/Revenue Category	CSES Question No.	CSES Question Detail	Inclusion Conditions
<u>Not more than 8 hours per week</u>	Q15.8	What was [NAME]'s employment status in his/her <u>main occupation</u> /economic activity?	1 = Employee 2 = Employer 3 = Own account worker 4 = Unpaid family worker (contributing family worker) 5 = Other, specify....
	Q15.9	How many hours did [NAME] work in his/her <u>main occupation</u> /economic activity during the past 7 days?	<=8
<u>Part-time work (8–39 hours per week)</u>	Q15.8	What was [NAME]'s employment status in his/her <u>main occupation</u> /economic activity?	1 = Employee 2 = Employer 3 = Own account worker 4 = Unpaid family worker (contributing family worker) 5 = Other, specify....
	Q15.9	How many hours did [NAME] work in his/her <u>main occupation</u> /economic activity during the past 7 days?	>8 & <40
<u>Seasonal Workers</u>  <i>Note: Seasonal is work done part of the year but the same job is reoccurring every year.</i>	Q15.8	What was [NAME]'s employment status in his/her main occupation/economic activity?	1 = Employee 2 = Employer 3 = Own account worker 4 = Unpaid family worker (contributing family worker) 5 = Other, specify....
	Q15.10c	Is [NAME]'s work in the past 7 days in the <u>main occupation</u> /economic activity <u>seasonal</u> ?	1 = Yes 2 = No
	Q15.33	Was the latest work [NAME]'s (within the past 13 months) <u>seasonal</u> ?	1 = Yes 2 = No

**B. Currently Excluded**

Income/Revenue Category	CSES Question No.	CSES Question Detail	Inclusion Conditions
<u>Farmers and fishermen</u>	Q15.8	What was [NAME]'s employment status in his/her <u>main occupation</u> /economic activity?	1 = Employee 2 = Employer 3 = Own account worker 4 = Unpaid family worker (contributing family worker) 5 = Other, specify....
	Q15.10e	Were the farm or fish products or other goods that (NAME) produced or helped produce in the last seven days in the <u>main occupation</u> /economic activity?	1= Only for own household use 2= Mainly for own household use but partly for sale 3= Mainly for sale, but partly for own household use 4= Only for sale
<u>Self-employed</u>	Q15.8	What was [NAME]'s employment status in his/her <u>main occupation</u> /economic activity?	1 = Employee 2 = Employer 3 = Own account worker 4 = Unpaid family worker (contributing family worker) 5 = Other, specify....
	Q15.10e	Were the farm or fish products or other goods that [NAME] produced or helped produce in the last seven days in the <u>main occupation</u> /economic activity? [exclusion of farmers]	1 = Only for own household use 2 = Mainly for own household use but partly for sale 3 = Mainly for sale, but partly for own household use 4 = Only for sale 0 = Not applicable
	Q15.7	Under what type of employer did [NAME] work in his/her main occupation/economic activity?	1 = Government 2 = State owned enterprise 3 = Cambodian enterprise 4 = Foreign enterprise (private) 5 = Nonprofit institution 6 = Household sector 7 = Embassies, International institutions and foreign aid and development agencies 8 = Other, specify
<u>Not currently working</u> (report of self-employment and not seasonally employed)	Q15.8	What was [NAME]'s employment status in his/her <u>main occupation</u> /economic activity?	1 = Employee 2 = Employer 3 = Own account worker 4 = Unpaid family worker (contributing family worker) 5 = Other, specify....



Income/Revenue Category	CSES Question No.	CSES Question Detail	Inclusion Conditions
	Q15.9	How many hours did [NAME] work in his/her <u>main occupation</u> /economic activity during the past 7 days?	=0
	Q15.33	Was the latest work [NAME]'s (within the past 13 months) <i>seasonal</i> ?	1 = Yes 2 = No

### C. Covered Under NSSF Schemes

Income/Revenue Category	CSES Question No.	CSES Question Detail	Inclusion Conditions
<u>Formal Workers and Employees</u>	Q15.7	Under what type of employer did [NAME] work in his/her main occupation/economic activity?	1 = Government 2 = State owned enterprise 3 = Cambodian enterprise 4 = Foreign enterprise (private) 5 = Nonprofit institution 6 = Household sector 7 = Embassies, International institutions, and foreign aid and development agencies 8 = Other, specify
	Q15.8	What was [NAME]'s employment status in his/her main occupation/economic activity?	1 = Employee 2 = Employer 3 = Own account worker 4 = Unpaid family worker (contributing family worker) 5 = Other, specify....
	Q15.9	How many hours did [NAME] work in his/her <u>main occupation</u> /economic activity during the past 7 days?	=>40
<u>Government</u>	Q15.7	Under what type of employer did [NAME] work in his/her main occupation/economic activity?	1 = Government
	Q15.8	What was [NAME]'s employment status in his/her main occupation/economic activity?	1 = Employee 2 = Employer 3 = Own account worker 4 = Unpaid family worker (contributing family worker) 5 = Other, specify....

## Annex 2. Vulnerability Group with Socio-Economic Survey Identification Questions

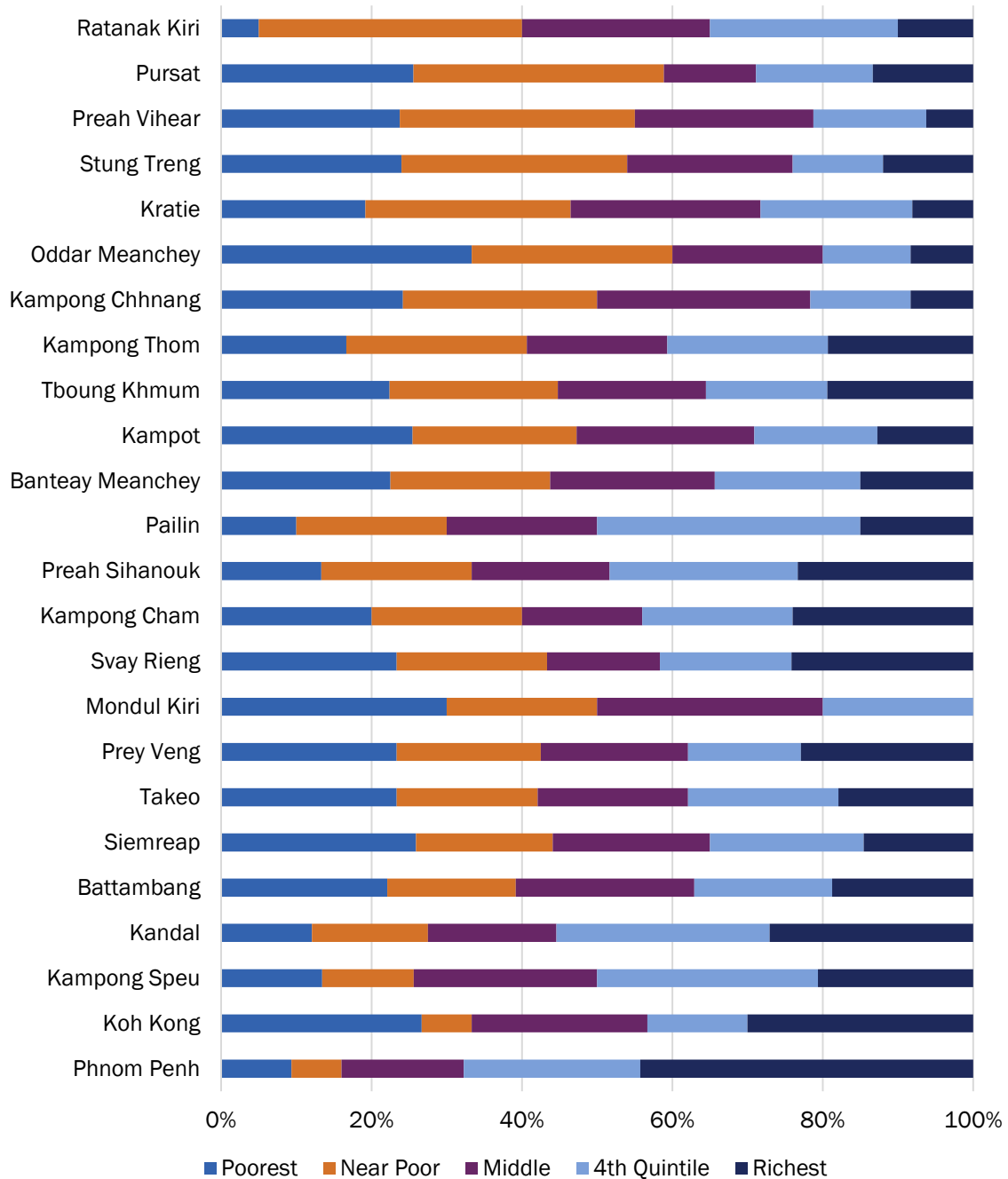
### Not Currently Covered

Vulnerability Group	CSES Question No.	CSES Question Detail	Inclusion Conditions
Children under 5 years of age	Q0.A.5a	What is [NAME]'s age in completed years?	= <5
Elderly over 65 years of age	Q0.A.5a	What is [NAME]'s age in completed years?	= >65
Disabled people	Q14.3a Q14.3b Q14.3c	Is the difficulty ...	1 = Mild 2 = Moderate 3 = Severe
Pregnant women	Q13.B.7	Has there been any other reason to go to a health facility or seek health care? If no, PROBE Has this person received care in relation to a pregnancy, immunization, or supplementation?	1 = Antenatal care 2 = Delivery 3 = Postnatal care 4 = Vitamin A or deworming 5 = Health check 6 = Other (specify) Register 0 if no

## Annex 3. Monthly Disposable and Effective Household Income Means and Medians, by Wealth Quintile, in US\$

Wealth Quintile	Disposable Income		Effective Income/Total Household Expenditure	
	Mean	Median	Mean	Median
Poor	30.31	38.66	181.12	191.02
Near-poor	154.89	157.19	275.38	276.37
Middle	275.16	277.39	365.51	364.71
Upper-middle	451.42	443.81	492.05	495.99
Rich	1,000.15	851.68	930.56	764.47
Total Population	383.20	308.14	448.80	403.09

## Annex 4. Wealth Quintiles, by Province, Rank-Ordered by the Proportion of the Near-Poor Population (Preliminary Results from 2014 CSES)



Source: National Institute of Statistics, 2015.

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