

Annex 1: Technical Annex

Design of the 2004 CSES

The 2004 CSES sample was selected from 45 strata (24 provinces, urban and rural)¹ in three steps using the 1998 Population Census as a sampling frame. First, 900 villages were selected from the various strata using systematic random sampling (with over-sampling in the urban strata). Second, one Census enumeration area was randomly selected from each sample village. Third, 10 (20) households were selected randomly from each urban (rural) sample enumeration area, yielding a total sample of 15,000 households (of which 14,984 were actually interviewed). One thousand households were interviewed in each month of the survey in a randomly selected (and therefore nationally representative) sample of 60 villages. The 2004 CSES is not self-weighting. Two sets of adjusted sample design weights² are provided, one for use with the calendar year 2004 sample of 12,000 households (of which 11,993 households were actually interviewed) and the other for use with the full sample of 15,000 households (of which 14,984 households were actually interviewed). Unless otherwise noted, all estimates presented in this report are based on the calendar year 2004 sample of 11,993 households actually interviewed and are weighted to be representative of the Cambodian population.

Survey Coverage

One major problem in preparing a comparable series of poverty estimates over time in Cambodia has been the changing (increasing) geographical coverage of the various household surveys over time. Coverage was initially quite low in the 1993/94 SESC due to security reasons, particularly in the Rural areas (i.e., only 56% of Rural villages and 65% of Rural households). Table 1 presents the regional and province distributions of the comparable samples from the three surveys, weighted by the estimated populations at the time of each survey.

¹ Three of Cambodia's 24 provinces do not have any rural areas (i.e., Kep, Sihanoukville and Pailin).

² The sample design weights are equal to the inverse of the probability of each household's selection and are based on the population structure (province, urban/rural, age and sex) of the 1998 Population Census

Table 1. Distribution (%) of comparable samples by province, 1993/94-2004

	1993/94	1997	2004
Region			
Phnom Penh	10.74	14.45	13.81
Other Urban	11.02	12.29	12.79
Rural	78.25	73.26	73.40
Cambodia	100.00	100.00	100.00
Province			
Banteay Meanchey	3.61	3.86	2.49
Battambang	4.68	6.07	4.36
Kampong Cham	18.85	16.34	17.03
Kampong Chhnang	2.48	2.64	3.14
Kampong Speu	2.16	1.66	2.41
Kampong Thom	0.92	0.84	0.83
Kampot	2.64	2.15	2.51
Kandal	13.19	13.10	13.85
Koh Kong	—	—	—
Kratie	—	—	—
Mondul Kiri	—	—	—
Phnom Penh	10.74	14.45	13.81
Preah Vihear	0.00	0.00	0.00
Prey Veng	15.32	14.89	13.64
Pursat	3.81	4.12	4.18
Ratanak Kiri	—	—	—
Siem Reap	2.96	2.18	3.29
Sihanoukville	0.72	0.86	1.91
Stung Treng	—	—	—
Svay Rieng	7.08	6.38	6.60
Takeo	10.84	10.48	9.95
Oddor Meanchey	—	—	—
Kep	—	—	—
Pailin	—	—	—
Cambodia	100.00	100.00	100.00
N	5,578	4,470	7,596

Source: 1993/94 SESC, 1997 CSES, 2004 CSES.

Household consumption

The detailed consumption categories used in the 1993/94 SESC serve as the reference point for defining the various categories of household consumption presented in Table 2 as these 1993/94 SESC categories were also used to define the various CSES recall categories (as indicated by the capsule descriptions of each category that are

provided in the CSES questionnaires). This information is presented below in connection with the description of the procedures used to estimate consumption in each broad category.

Table 2: Definition of household consumption based mainly on recall data from the 2004 CSES

Consumption category	Source of information	Period	Number of days
1. Food & beverages	Household questionnaire, Section 1D: questions 1-16, 18-20	Last 7 days	7
2. Clothing & footwear	Household questionnaire, Section 7B, question 1	Last 6 months	182.5
3. Housing & utilities			
3.1 Housing			
3.1.1 Rent/accommodation			
Paid rent	Household questionnaire, Section 3, question 28	Last month	30.4
Estimated rent	Household questionnaire, Section 8, question 6	Month	30.4
Hotel/accommodation charges	Diary, items 9407, 9415	Calendar month	Number of days in calendar month
3.1.2 Housing maintenance	Household questionnaire, Section 3, question 29	Last month	30.4
3.2 Utilities			
3.2.1 Water & sanitation charges			
Water charges	Household questionnaire, Section 3, question 17	Last month	30.4
Sewage/waste water charges	Household question, Section 3, question 21	Last month	30.4
Garbage collection charges	Household question, Section 3, question 22	Last month	30.4
3.2.2 Fuel/power for cooking & lighting			
3.2.2.1 Non-wood fuels			
Electricity	Household question, Section 3, question 24a	Last month	30.4
Gas	Household question, Section 3, question 24b	Last month	30.4
Kerosene	Household question, Section 3, question 24c	Last month	30.4
Battery	Household question, Section 3, question 24f	Last month	30.4
3.2.2.2 Wood fuels			
Firewood	Household question, Section 3, question 24d	Last month	30.4
Charcoal	Household question, Section 3, question 24e	Last month	30.4
3.2.2.3 Other fuels	Household question, Section 3, question 24g	Last month	30.4
4. Household furnishings and household operations	Household questionnaire, Section 7B, question 2	Last 6 months	182.5
5. Medical care	Household questionnaire, Section 14, question 12 (only for those reported ill).	Past 4 weeks	28
6. Transportation and communications	Diary, items 7111-8081	Calendar month	Number of days in calendar month
7. Recreation	Household questionnaire, Section 7B, question 3	Last 12 months	365

Consumption category	Source of information	Period	Number of days
8. Education	Household questionnaire, Section 2, questions 14a-14h (total is given in question 14h)	Past school year	365
9. Personal care & personal effects			
9.1 Personal care	Diary, items 9513-9721, 9805, 9813	Calendar month	Number of days in calendar month
9.2 Personal effects	Household questionnaire, Section 7B, question 4	Last 12 months	365
10. Tobacco	Household questionnaire, Section 1D, question 17	Last 7 days	7
11. Miscellaneous	Household questionnaire, Section 7B, question 5	Last 12 months	365

Source: 2004 CSES questionnaires.

This report presents estimates of household consumption for two of Cambodia's multi-objective household surveys, the 1993/94 SESC, and the 2004 CSES. Data on household consumption were collected in the 1993/94 SESC for a sample of 5,578 households (from a geographically truncated sample) and are generally regarded to be at least reasonably accurate. The 1993/94 SESC household questionnaire collected recall data for a large number of consumption items (177 food items and 266 nonfood items). The 1993/94 SESC was also conducted in four rounds during a 12-month period (i.e., from October 1993 through September 1994). Accordingly, the estimates of average household consumption it provides are presumably not affected by seasonal variation in either consumption quantities or prices. The 1993/94 estimates of household consumption presented in this report were prepared using the same data file used by the authors of the 1993/94 Poverty Profile, as reported in that document (Prescott and Pradhan 1997).³

³ The data file is a Stata file with the name "reqsmall.dta".

The 2004 CSES collected data on household consumption from 14,984 households using two distinct methodologies, i.e., a set of recall questions similar to those used in the 1997 and 1999 CSES and a calendar-month diary that was completed by respondents with the assistance of interviewers who remained in each sample village for one full month. The consumption estimates presented in this report are prepared with data collected during calendar year 2004 and are prepared for the most part using the recall data. However, diary data were used to estimate consumption for two categories (transportation and communications and personal care) because no recall data were collected for these two consumption categories.⁴ No adjustments were made to the reported data apart from imputation of an estimated rental value for owner-occupied housing for the 5.9% of sample households that did not report one and for the 2.4% of households that reported

⁴ Since the reference period for these items was "the last month" in previous CSES rounds, it was presumably decided that there was no need to collect recall data for the same reference period as the diary.

a zero value.⁵ The consumption data in the 2004 CSES are most comparable to those in the 1993/94 SESC inasmuch as both surveys collected consumption data for at least a 12-month period. However, the consumption data in the 2004 CSES are not comparable to the 1993/94 SESC consumption data in at least one respect, i.e., recall data were collected for many fewer consumption categories in the 2004 CSES than in the 1993/94 SESC (20 food categories versus 177 in the 1993/94 SESC and 13 nonfood categories versus 266 nonfood categories in the 1993/94 SESC).

Updating the baseline poverty lines for inflation⁶

Cambodia's baseline poverty line consists of a single national food poverty line and three regional nonfood allowances. The baseline values are in 1993/94 Riel and refer to daily per capita levels of food and nonfood consumption. Both the food poverty line and the regional nonfood allowances need to be updated for inflation, i.e., they need to be converted into average calendar year 2004 prices. This section discusses the procedures used in updating the baseline poverty lines for inflation.

Updated food poverty line

The food poverty line is based on the estimated cost of a single national reference food bundle providing an average subsistence diet of 2,100 calories per day (i.e., averaged over

persons of all ages and both sexes).⁷ The reference food bundle was designed to reflect the actual food consumption patterns of Cambodians who consumed a diet yielding approximately 2,100 calories per day. It is based on the quantities of different foods consumed by persons in the middle per capita consumption quintile, as this was the first quintile that met the 2,100 calorie minimum. A single reference food bundle was used for all Cambodians.

The 1993/94 baseline food "prices" are in fact the median unit values calculated from household responses on the value and quantity of individual foods consumed in the 1993/94 SESC.⁸ These were the "prices" used to estimate the 1993/94 cost of the reference food bundle in each region (i.e., Phnom Penh, Other Urban and Rural).⁹ The three regional baseline food poverty lines have been previously updated for the effects of inflation in the 1997 and 1999 poverty profiles using a common methodology (Knowles 1998, MOP 2000). This methodology involves estimating food

⁷ Gibson made some minor corrections to the original baseline food poverty lines in 2000 (MOP 2000), and these corrected values are the ones used in this report.

⁸ Only cash transactions were used in computing the 1993/94 unit values because they were considered to be more reliable measures of actual prices (Prescott and Pradhan 1997). In fact, even the cash unit values in Phnom Penh are about 11% lower than the corresponding 1994 market prices in the Phnom Penh CPI (Annex 1). However, as noted further along in the text, the estimates of inflation in this report are not based on comparisons between prices and unit values.

⁹ Beginning with the 1998 Population Census several districts in Phnom Penh were reclassified from urban to rural. For surveys conducted after 1998, therefore, the correct regional nomenclature is Phnom Penh, Other Urban and Other Rural.

⁵ By comparison, only 3 households reported a zero rental value in the 1997 CSES. The reasons for imputing a nonzero value for such responses in the 2004 CSES are discussed in Annex 4.

⁶ Details can be found in Knowles, James "A new set of poverty estimates for Cambodia, from 1993/94 to 2004", August 2005, posted on the World Bank's Phnom Penh Office website.

price inflation in Phnom Penh using price data from the Phnom Penh CPI and quantity weights from the baseline reference food bundle and using household survey data (i.e., village food prices collected in the 1997 and 1999 CSES) to estimate spatial (regional) differences in food prices in a given year (i.e., 1997 or 1999). This two-step procedure is necessary because the 1997 and 1999 CSES did not collect sufficiently detailed consumption data (and no data on consumption quantities) to enable the calculation of unit values. The same two-step methodology is used in this report to estimate inflation in food prices during the period 1993/94 to 2004. One advantage of this methodology is that it avoids direct comparisons between unit values and prices.

Table 3 presents estimates of average annual rates of inflation in food prices for the periods between four household surveys (columns 2-4) and for the entire 10-year period, 1993/94-2004 (column 5).¹⁰ Table 4 presents updated food poverty lines and the food price index using the quantities in the reference food bundle as weights.

¹⁰ Column numbering in this report begins with the left-most column in a table (which usually contains labels).

Table 3: Average annual rates of inflation in food prices (weighted by the reference food bundle), 1993/94-2004

Region	1993/94-1997	1997-1999	1999-2004	1993/94-2004
Phnom Penh	5.0	12.5	0.5	4.2
Other Urban	3.3	20.1	-0.2	4.6
Rural	2.1	21.2	0.1	4.6

Table 4: Updated food poverty lines (current Riel per capita per day) and food price index (weighted by the reference food bundle), 1993/94-2004

Region	1993/94	1997	1999	2004
Food poverty lines (current Riel per capita per day)				
Phnom Penh	1,185	1,372	1,737	1,782
Other Urban	996	1,098	1,583	1,568
Rural	882	938	1,379	1,389
Food price index (1993/94 Phnom Penh=100)				
Phnom Penh	100.0	115.8	146.6	150.4
Other Urban	84.1	92.7	133.6	132.3
Rural	74.4	79.2	116.4	117.2

Updated nonfood allowances

The baseline nonfood allowances are defined as the estimated value of nonfood consumption of Cambodians whose total per capita household consumption is just equal to the food poverty line. This is a minimal nonfood allowance since it represents nonfood consumption that is at the expense of food consumption that could otherwise be used to achieve an average daily diet with 2,100 calories by consuming the reference food bundle.¹¹ Although a

single reference food bundle is used for all regions, the baseline nonfood allowances vary in their commodity composition. For example, in 1993/94, Phnom Penh households with levels of per capita nonfood consumption within 20% of the Phnom Penh nonfood allowance allocated more of their nonfood consumption to housing and utilities (and especially to rent) than corresponding households in the Other Urban or Rural regions. This is due to the regression methodology that was used to derive the 1993/94 baseline nonfood allowances (Prescott and Pradhan).¹²

¹¹ Although persons with total per capita consumption below the food poverty line would have to sacrifice some food consumption to purchase nonfood items, they would presumably substitute cheaper foods for more expensive foods within the reference food bundle. There is considerable scope for such substitution within the reference food bundle. For example, although both items absorbed similar shares of the cost of the reference food bundle, the cost per 100 calories of rice was about 20 Riel in 1993/94 Phnom Penh prices compared to the cost per 100 calories of 342 Riel for a small mudfish (MOP 2000).

In order to update the different regional nonfood allowances for inflation, it is necessary to have a nonfood price index

¹² Although the intention was to obtain different regional nonfood allowances that reflected regional differences in absolute prices, it is clear from the discussion in Annex 2 that the estimated nonfood allowances also reflect regional differences in relative food/nonfood prices and probably also regional differences in preferences.

similar to the food price index presented in Table 4 above. The main obstacle to preparing such an index is that there is very little information on nonfood prices outside of Phnom Penh prior to the 1997 CSES, which collected village price data for 42 nonfood items. Apart from extensive data on nonfood prices in the Phnom Penh CPI, which dates from July-September 1994, data on nonfood prices in the other regions are limited to recently discovered data that can be used to calculate unit values of clothing and tobacco consumption in the 1993/94 SESC and estimates of rental housing prices by region that can be obtained from hedonic price regressions. The estimates of inflation in nonfood prices prepared in this report are based on these limited data sources and were obtained using a similar methodology to that used to estimate inflation in food prices, i.e., nonfood price data from the Phnom Penh CPI (weighted to reflect the different commodity compositions of each regional nonfood allowance) were used to estimate inflation in Phnom Penh nonfood prices, while survey data were used to estimate spatial differences in nonfood prices in 1993/94 and 1997. Similar methods were also used to estimate inflation in nonfood prices during the period 1997-2004 for which more data are available.

Table 5 provides estimates of average annual rates of inflation in nonfood prices during the period 1993/94 to 2004 (but excluding the period 1997-1999 because estimates of inflation in nonfood prices are not available for this period).¹³ Table 6 presents the inflation-adjusted regional nonfood allowances and (total) poverty lines (i.e., the sum of the updated food poverty lines in Table 4 and the updated nonfood allowances) and the estimated nonfood price index using weights reflecting the estimated commodity composition of nonfood consumption among households with per capita consumption within 20% of the nonfood allowance for the region in which they reside.¹⁴

¹³ No estimates of inflation in nonfood prices were prepared in connection with the 1999 Poverty Profile (MOP 2000).

¹⁴ No inflation-updated estimates of the nonfood allowances are provided in Table 6 for 1999 because the 1999 Poverty Profile estimated a new set of regional nonfood allowances using a similar methodology to that used to estimate the baseline nonfood allowances.

Table 5: Average annual rates (%) of inflation in nonfood prices (weighted by the estimated commodity composition of regional nonfood allowances), 1993/94-2004

Region	1993/94-1997	1997-2004	1993/94-2004
Phnom Penh	2.9	4.2	3.8
Other Urban	3.4	3.7	3.6
Rural	4.6	4.4	4.4

Table 6. Updated nonfood allowances and total poverty lines (current Riel per capita per day) and nonfood price index (weighted according to the estimated commodity composition of the regional nonfood allowances)

Region	1993/94	1997	2004
Nonfood allowances (current Riel per capita per day)			
Phnom Penh	393	428	569
Other Urban	269	297	384
Rural	236	270	364
Total poverty line (current Riel per capita per day)			
Phnom Penh	1,578	1,800	2,351
Other Urban	1,265	1,395	1,952
Rural	1,118	1,208	1,753
Nonfood price index (1993/94 Phnom Penh prices=100)			
Phnom Penh	100.0	108.8	144.8
Other Urban	90.4	99.9	129.0
Rural	78.0	89.3	120.4

Note: Total poverty lines obtained by summing updated food poverty lines and updated nonfood allowances.