Methodological Report on the Consumption Aggregate and Poverty Lines

based on the

2022 Suriname Survey of Living Conditions

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EXECUTIVE SUMMARY

In 2016/17, the first Surinam Survey of Living Conditions was conducted; a second survey was implemented in 2022. For both, poverty was estimated by comparing the per capita consumption with two poverty lines: extreme and overall (moderate) poverty. The questionnaires, sampling design and field work were kept similar between surveys, thus improving the quality of welfare comparisons.

After reviewing the 2016/17 per capita consumption, an adjustment was made in the value of non-bought food consumed at home; it was underestimated. For poverty comparisons, the 2016/17 consumption was computed again with the correct value for non-bought food consumed at home.

In 2022 Surinam's monthly per capita Consumption was SRD 5,042, a 1% decreased from 2016/17. Whereas Great Paramaribo experienced a 1.4% decrease, there was an increase of 3.7% in the Rest of the coastal region and of 6.4% in the Interior .

The 2016/17 poverty lines were updated using the food and non-food portions of the Surinam Consumer Price Index (CPI). Extreme poverty in 2022 was 2.6%, an increase of 1.9 percentage points from 2016/17. The increases were also significant for the coastal regions. Overall poverty in 2022 was 21.7%, While it decreased in Surinam and in all three regions, the reductions in overall poverty were too small to be called real changes.

All the changes in Extreme poverty were mostly driven by changes in inequality. Changes in the level of consumption do not seem to have any impact on extreme poverty nor overall poverty.

Recommendations

1. *Validate poverty results with non-monetary indicators from the 2016/17 and 2022 surveys and other data sources.*
2. *To reduce the number of outliers in future surveys, introduce filters during the field work, especially in the food section.*
3. *For the non-bought food consumed at home, also ask the households to provide a value estimate of their weekly consumption.*

1. INTRODUCTION

This document includes a detailed description of the third Report/Deliverable from the IDB "PEC" contract with Carlos E. Sobrado**,** Contract/Ticket Number: HRC0037157, Responsible Unit: CCB/CSU Country Office Suriname; Start Date: March 30, 2023, Expiration Date: July 28, 2023.

As per the terms of reference included in Annex A of the contract, this is the Final Report/Deliverable: "Methodological report outlining the details of the methodology used for the calculations."

There are five sections in this document: first, the introduction; second, a description of the consumption aggregate, its components, variables, and transformation; third, the construction of poverty lines; fourth, basic poverty results; and fifth, comparisons with the previous household survey (SSLC-2016/17). The main source of information for the work is the 2022 Suriname Survey of Living Conditions (SSLC-2022). Secondary sources are the Consumer Price Index (CPI), and previous poverty lines, consumption, and poverty results.

2. MEASURING CONSUMPTION WITH THE SSLC-2022

JUSTIFICATION

The main welfare indicator in this work is per capita consumption. Consumption is preferred over income, because consumption tends to fluctuate less between months and over the years. For example, people smooth their consumption over time by saving money (e.g., bank account), resources (e.g., cattle, crops), or investing (e.g., housing, land), and by using those savings when needed. Also, respondents tend to provide more accurate information on consumption than income. Further, while consumption is an objective measure of welfare, indicators based on multiple combined variables use subjective definitions, including which variables are included and the respective weights assigned to their components.

WHAT IS INCLUDED IN THE CONSUMPTION AGGREGATE?

Consumption includes all goods and services that improve a household's welfare. Consumption and expenditure are similar but are not the same; important differences exist in cases when (i) a household consumes a good or service without having any expenditure: food received as a gift, social program, or school lunch; (ii) the expenditure and consumption take place at a different time: the purchase of a bag of rice a month ago consumed during last week; (iii) the consumption is the product of a family business: crops or cattle with many expenditures over long periods of time; (iv) the durable goods improve the wellbeing of the household during many years: a stove purchased a few years ago does not require new expenditures but keeps improving the household's welfare today; also, the benefits derived from a new stove this year are less than the original purchase price.

The SSLC-2022 has the information to construct the consumption aggregate. The consumption aggregate includes foods and drinks (purchased or non-purchased), use value of housing, housing

utilities, education, health, transport, communications, personal and household expenditures, small and medium durable purchases, entertainment, and other consumption (see Box 1).

The SSLC-2022 does not have enough information to estimate the use value of durable goods. Using the purchase value for big ticket items does not solve the problem and instead increases the bias of households reporting new items. Excluding the durable goods would underestimate the consumption aggregate value but reduces the bias for individual households and is expected to have very limited impact on poverty estimates (see individual components for a detailed list of excluded items).

Module four in the questionnaire, "Government social safety net programs", was reviewed to evaluate the need and feasibility to include in-kind benefits as part of the consumption aggregate. There were only 20 in-kind benefits reported in the survey with values other than SRD 0. The rest of the benefits were cash and checks used by households to purchase goods and services that were expected to be reported in other sections of the questionnaire and included in the consumption aggregate. Of the 20 in-kind benefit cases, two reported a value of SRD 3, and no estimation was provided on the rest. Given the lack of actual values and the very low level of the few reported, in-kind social benefits are not included in the consumption aggregate.

VARIABLE CLEANING AND UNITS

Variable Cleaning

All the variables used in the consumption aggregate were reviewed to identify values out of range, outliers, and missing values. An action was taken for every case, with the purpose of reducing the bias introduced by the problem and providing a reasonable estimate.

Answers with values not included in the questionnaire's list were out of range. The "out of range" values were changed to those that were valid depending on other answers given by the household or, if no other option was available, the most common answer.

Outliers are observations with values too different from the rest to be true. The three characteristics used to determine outliers were: (i) standard deviations from the mean; (ii) a clear jump in values between the outliers and the next observation (based on inspection of plotted values in a graph); and (iii) total number of outliers being a small percentage of the observations.

The value of some variables is expected to increase with the number of household members, as in the case of food purchases where, the bigger the household, ceteris paribus, the more food is

consumed. Other variables do not change much regardless of household size[1]; for example, the purchase value of an electric iron tends to be the same without relation to household size. To help determine the sensibility of non-food expenses to number of household members, a regression between the average value paid (dependent variable) and the household size (independent variable) was estimated[2]. For all variables, except for some items in the non-food section of Module 12, the reported amounts were divided by the number of members before estimating the number of standard deviations from the mean.

Except for Module 12, each individual outlier was more than 6.5 standard deviations away from the mean and the total number of outliers for each variable was less than half a percentage point of the reported values (< 0.5%)[3]. Module 12 had an unusual number of outliers and especial circumstances that made the use of more aggressive techniques necessary. See **Table 2** for the actual values used on each questionnaire module[4].

Module 12

Module 12 included outliers with extremely high values. These "super outliers" hide the presence of normal outliers when using the number of standard deviations. To solve this problem a two-step process was adopted. First, values higher than ten times the mean or more than ten standard deviations from the mean were identified as "super outliers". Second, the mean and standard deviations were estimated without the "super outliers", and all cases with more than five to seven standard deviations or greater than eight to 10 times the mean were classified as outliers and their reported value replaced with an estimation. **Table 2** has the values for the maximum standard deviations and means used in the two steps for each section in Module 12.

The food part of Module 12 also includes a section where households provide information regarding the amount of non-bought food consumed at home (produced, received as gifts, etc.). The quantities reported included a high number of cases with values that were not credible or possible. For example, 913,125 Kilograms of rice per year per person, equivalent to 2,502 Kg of rice per day, is not credible; not even one-thousandth of that, 2.5 Kg of rice per day, is physically possible to consume. The number of cases with such characteristic were too many for the use of standard deviations to detect outliers. To avoid their use, a maximum per capita quantity was

[1] Household size is the number of household members.
[2] The regression was run for all goods and services reported in Module 14, parts B, C and D (Household non-food consumption and expenses).
[3] The number of standard deviations used to identify outliers was adjusted according to the type of expenditure and data characteristics.
[4] This is the first year the data was collected using electronic devices. The new method did not include the same checks and review process as done in the previous survey (2016/17) and the data sets were not as "clean as before". This was confirmed by informal conversations with people supervising the field operation and data processing.

defined, and values above were deleted; the average per capita consumption in Surinam dollars was used. The upper limits used are listed in **Table 1** .

Table 1 Per Capita Maximum Quantities Permitted for Food Products without Values

Products	Maximum/Week
All products reported in Kilograms	1.5 Kilograms[5]
Evaporated Milk; Sweetened, condensed milk; Sunflower oil; & Other vegetable oil	½ liter
Milk - fresh, pasteurized; Yoghurt; Bottled water; Soft drinks; Fruit juices; Flavored or colored sugar syrups; Flavored water; Soda water; Dawet; Other (Specify); & Beer	7 liters
Whiskey; Rum; Sparkling wine; Wine & 1099 Other (Specify)	4 liters

Note: The median unit value for each product was used for food items with quantity information but no value.

Missing Values

Missing values are observations where a household member reported having purchased or consumed a good or service but did not provide its value. Outliers and missing values were estimated together. The average value for the specific item was used to replace the outlier or the missing value[6]. For variables sensible to household size, the per capita value was used for the estimation and then transformed back to the total household expenditure. A record of every estimation was kept, having an exact value of the consumption aggregate estimated share.

[5] 1.5 Kilograms per week is equivalent to half a pound per day. For some products like grains, this is only a fraction of the actual cooked weight. It is important to remember that this is a limit for only one product and almost everybody consumes more than one food product per day.

Table 2 Cut Off Point for Outliers and Share of Estimated Outliers and Missing Values

File	1st selection		2nd selection		# of outliers (%)	Missing values (%)
	SDM	Means	SDM	Means		
01 Education	6.5	-	-	-	0.14%	4.39%
02 Social P	-	-	-	-	-	-
03 Health	6.5	-	-	-	0.31%	1.78%
04 Perso. Exp	6.5	-	-	-	0.23%	5.05%
06 Rent paid	6.5				0.00%	
05 Food: Value	10	10	7	10	0.68%	2.02%
05 Food: Quantity	10	10	5	8	5.55%	2.97%
07 Personal Non-Food	10	10	6.5	10	0.46%	2.62%

Outlier selection and estimates were calculated separately for each domain: Great Paramaribo, Rest of the Coastal Region, and Interior. Also, for some sections like education, the estimation was for public or private institutions and by level/grade. For all 13,472 observations with non-bought food (self-produced, gifts received, etc.), only quantity information was asked, and no value was provided by the households. The 5.5% represents outliers in the quantity value; the value in SRD is estimated for all cases. All selection criteria and proportion of outliers and missing values are presented in **Table 2**.

Variable Units

Before adding the individual components, all variables were converted to the same units: monthly and per capita (per person). Each question has a recollection period (e.g., during the last X number of days or months have you spent any…). The recollection periods used in the consumption questions included 7 days, 30 days, 3 months, and 12 months. All reported values were converted to monthly units multiplying them by the appropriate factor: the values for 7-day questions were multiplied by 52 and divided by 12, 30-day questions were not changed, 3-month questions were divided by 3, and 12-month questions were divided by 12.

To consider the change of the Surinam Dollar (SRD) purchasing power over time, the individual reported values were deflated using the official CPI. Using the General Bureau of Statistics of Suriname (ABS) information, a CPI index was created by dividing each monthly CPI value by the June 2022 CPI value (***Annex 1***).

For each household, the last day of the interview was selected as the reference month. The purchase month was the same as the reference month for questions with recollection periods of seven and 30 days. The previous month was used for recollection periods of three months. Six months before the reference month was used for questions with recollection periods of one year.

The corresponding CPI index was used for each purchase month. Each consumption aggregate component was multiplied by the index.

Consumption values were first estimated using the data file's organization, reflecting the design of the questionnaire. Some questions were asked for each individual family member, other questions were for the entire household. Regardless of the organization, the individual consumption variables were added up for all household members. After creating the 11 groups listed in **Box 1**, the per capita values were estimated by dividing the household consumption by the number of household members. The consumption aggregate components are in "Monthly, Per Capita, June 2022 SDR".

Box 1 Consumption Aggregate Components and Sub-Components	
1-Food and drinks	• Food at school (M3 Q03_19j) • Food bought and consumed outside the house (M11 Q11_02_01 to Q11_02_14) • Food consumed at home (M14.A Q14_03_2 and estimate from Q14_05)
2-Use value of housing	• Rent paid (M14.B Q14_d2 for code 1101) • Use value of house estimated with regression
3-Utilities	• Fuel, electricity, and water (M14B Q14_d2 for codes 1201 to 1210)
4-Education	• Education expenses (M3 Q03_19a to Q03_9k, excluding Q03_19j)
5-Health	• Total health expenditures (M5 Q05_21, Q05_23, Q05_25, & Q05_28) • Medical insurance and others (M14B Q14_d2 for codes 1701 to 1703)
6-Transport	• Petrol, oil, parking, etc. (M11 Q_11_02_19 to Q_11_02_23) • Bus and Taxi (M11 Q_11_02_24 to Q_11_02_27) • Maintenance, fees (M14.D Q14_d2 for codes 3301 to 3307, 3403, 3405 & 3501 to 3504)
7-Communication	• Cell Phone cards and Internet cafes (M11 Q11_02_34) • Communications (phone, internet) (M14B Q14_d2 for codes 1801 to 1803)
8-Personal & household	• Cleaning supplies and Personal care (M14.B Q14_d2 for codes 1301 to 1621) • Clothes, footwear, linens, & tailors (M14.C Q14_d2 for codes 2101 to 2514 and M14.D Q14_d2 for codes 3101 to 3104, & 3801 to 3802)
9-Small & med. durables	• Durables (M14.C Q14_d2 for codes 2802-2809, 2901-2907, 2910-2917, 3001, 3005-3006, 3008-3010, 3012, 3201-3203, 3404, 3705, 3803)
10-Entertainment	• Recreation (M11 Q_11_02_28 to Q_11_02_33) • Recreation, services, celebrations (M14.B Q14_d2 for codes 2001 to 2008, and M14.D for codes 3601 to 3602, 3701, 3704, 3707 to 3709 & 3806 to 3808)
11-Other	• Tobacco (M11 Q_11_02_15 to Q_11_02_18) • Other non-food (M14.B Q14_d2 for codes 1103 to 1108, 1901 to 1904 and M14.D Q14_d2 for codes 3804 to 3805 & 3809 to 3811)

Key: "M" is for Module; "Q" is for Question.

INDIVIDUAL COMPONENTS IN THE CONSUMPTION AGGREGATE

Having several components in the consumption aggregate helps in organizing the work and interpreting the results. The only division that is necessary to estimate the poverty lines is

between the "food" and the "non-food" components[7]. Other groups reflect the design of the questionnaire and the preferences of the analyst. Welfare level and poverty status for each household are based on the total consumption aggregate and do not change with the grouping. The individual components of the consumption aggregate are included in the STATA data file "2022 h Consumption2.dta" (or the SPSS data file "2022 h Consumption2.sav") and the variable names are included as part of each variable label.

Food And Drinks

The food variable, **food2**, includes food or snacks at school (variable **Food_1_2** from module 3-Education, question Q3_19j), food bought and consumed away from home (variable **Food_2_2** from module 11-Personal expenses, questions Q11_02_01 to Q11_02_14), and food consumed at home (variable **Food_3_2** from module 14.A-Consumption of food and beverages in the past 7 days[8], question Q14_03_02, and non-bought food from Q14_05, for all food items from code 0101 to 1011).

House Use Value

Use value of house variable, **house2**, includes the monthly rent paid (variable **Rent_1_2** from module 14b-Non-food expenses in the past 30 days, question Q14_D2, item 1101). For non-renters, the use value of the house was estimated using the prediction from a multivariable regression (variable **House_1_2**).

Using the household's reporting rent, a regression was estimated between the natural logarithm of the rent paid (dependent variable) and several house characteristics (independent variables). Almost all variables from the housing section of the questionnaire were used (module 13-Housing). Discrete variables were converted into Dummy variables by grouping classifications related to higher rent values. The final model included seven variables and the constant, encompassed two geographical locations, wall materials, security features (security bars in all windows), having tap water, a water tank, and a solar water heater in the house. Selected variables were significant at $p \leq 7.6\%$ and with positive beta values.

[7] Food includes food and all types of drinks. The poverty lines in 2022 are estimated using the 2016/17 values and, even this division is not necessary.

[8] This includes food prepared at home. It excludes prepared food that was bought, and normally eaten outside the home. The filter question is about food consumed during the last 7 days, but the value is about the last purchase (and how often is purchased). Fon non-purchase food, the quantity consumed per week was asked.

The model was significant with a p ≤ 0.1% and the adjusted R squared was 0.269. **Table 3** has the detailed description of the variables as well as the estimated beta, t value, and significance level. **Annex 2** has the complete regression results.

Using the beta values from **Table 3**, the "rent natural logarithm" was estimated. The actual estimated "rent" is the exponential value of the prediction ($e^{predicted}$) [9]. The estimated rent was used as the house use value for those households without rent, and the actual rent was used for households paying rent.

Table 3 Rent Paid Regression Results, Suriname SSLC-2022

	Beta	T	Sig.
Constant	8.588	51.107	.000
Lives in Paramaribo (Domain =1 & gp_subdom =1)	0.307	2.210	.028
Lives in the outskirts of Paramaribo or the interior (Domain =1 & gp_subdom =2 OR Domain =3)	0.284	1.960	.051
Outer house walls of building stones (q13_08_5)	0.188	1.782	.076
House with security bars in all windows (q13_12d = 1)	0.369	3.506	.001
Pipe water in the dwelling (q13_15 = 1)	0.375	2.596	.010
Water tank in the house q13_23c > 0	0.448	4.878	.000
Solar water heater in the house (q13_23d > 0)	0.437	1.940	.053

Dependent variable is the natural log of actual monthly rent paid
Adjusted R-squared =0.269

Housing Services

The Housing services variable, **electric2**, includes services directly related to the house. It has the variable Q14_d2 from Module 14.B, items 1201 to 1210: electricity, petroleum, bottle gas, water supply, and other fuel and light expenditures.

Education Expenditures

The Education expenditures variable, **educat2**, includes variables in Module 3-Education, Questions Q3_19a to Q3_19k, except for question Q3_19Q9j (Food or snacks at school). The ten variables are: registration fees, examination fees, tuition fees, textbooks, exercise books and stationery, uniform dress and footwear, private tutoring, accommodation expenses, transport cost, and other expenditures.

[5] The number ***e*** is a mathematical constant that is the base of the unique number whose natural logarithm is equal to one. It is approximately equal to **2.71828** and is the limit of $(1 + 1/n)^n$ as n approaches infinity.

Health Expenditures

The health expenditures variable, **health2**, has two components: individual medical expenditures (**Health_1_2**), and family expenses (**Health_2_2**). Individual personal expenditures are estimated with Module 5-Health, questions Q05_21 (private medical services), Q05_23 (other medical care services), Q05_25 (other medical products), and Q05_28 (medicines from public or private source). Family expenditures are estimated with the information from module 14b-Non-food expenses reported in variable Q14_d2 items 1701 (medical insurance), and items 1702 and 1703 (other medical expenses).

Transport

The Transport variable, **transpor2**, has three components -- first, variable **Transport_1_2**: moving expenses (Module 11-Personal expenses, questions Q_11_02_19 to Q_11_02_23: Diesel oil, Gasoline, lubricating oils, parking fees and others), second, variable **Transport_2_2**: bus and taxi fares (Module 11-Personal expenses, questions Q_11_02_24 to Q_11_02_27: bus fares, taxi fares and boat fares) and third, variable **Transport_3_2**: maintenance and fees (Module 14.D-Non-food expenses in the last 12 months, question Q14_D2 for codes 3301 to 3307, 3403, 3405 & 3501 to 3504: batteries, car parts, new tires, service, mechanic, other maintenance, vehicle insurance, other insurance, and transport equipment and vehicle registration fee).

Communications

The communications variable, **communic2**, has two components -- variable **Communication_1_2** from Module 11-Personal expenses (question Q11_02_34: Cellphone prepaid card top up), and variable **Communication_2_2** from Module 14.B-Non-food expense in the past 30 days (question Q14_D2 for codes 1801 to 1803: Internet, phone, cable TV fees; Mobile phone fees; and Internet TV).

Personal and Household Expenditures

The personal and household expenditures variable, **personal2**, has two main components from Module 14-Non-food expenses, question Q14_d2. The first component, variable **Personal_1_2,** includes expenses in the last 30 days from codes 1301 to 1621 (sections 13-Washing soaps and detergents, 14-Other cleaning and scouring materia, 15-Other household supplies, and 16-personal care). The second component, variable **Personal_2_2,** includes expenses in the past three months from codes 2101 to 2514 (sections 21-clothes and footwear for men, 22-clothes and footwear for women, 23-clothes and footwear for boys, 24-clothes and footwear for girls, and 25-Other clothing and accessories), and expenses in the past twelve months from codes 3101 to 3104 (section 31-Household linens), and codes 3801 (Dress-making) and 3802 (Tailoring).

Small and Medium Durables

This variable, **durables2**, has only one component, **Durables_1_2**, estimated with Module 14.C-Non-food expenses in the past twelve months, question Q14_d2, codes 2802 to 2809 (color TV, DVD player, Digital music player, portable radios, digital video camera, mobile phone, and other) 2901 to 2907 and 2910 to 2917 (section 29-Furniture and soft furnishing excluding 2908-Kitchen cabinet and 2909-Living room set), 3001 (Blenders), 3005 (Electric irons), 3006 (Electric stoves), 3008 (Microwaves and toasters), 3809 (Room fans), 3010 (Vacuum cleaners), 3012 (other appliances), 3201 to 3203 (section 32-Glassware, cutlery, and crockery), 3404 (Bicycles), 3705 (Video game console), and 3803 (Appliances and equipment repair).

The fourteen big and expensive durable goods excluded from the consumption aggregate can be found in Module 14-Non-food expenses: 2801-Flat-screen TV, 2810-Smart TV, 2908-Kitchen cabinet, 2909-Living room set, 3002-Washing machines, 3003-Deep freezers, 3004-Refrigerators, 3007-Gas stoves, 3011-Air conditioner, 3401-Motor car, 3102-Motorcycle, 3702-Personal computer, 3703-Laptop, and 3706-Computer peripherals.

Entertainment

The entertainment variable, **entertai2**, includes individual recreation expenditures **Entertaiment_1_2**: Module 11-Personal expense, questions Q_11_02_28 to Q11_02_33) and **Entertaiment_2_2**: household level expenditures from Module 14-Non-food expenses, question Q14_d2 from part B-Expenses in the past 30 days (Section 20-Other Services, codes 2001 to 2008), and from part D-Expenses in the past 12 months (codes 3601-Travel, return airfare, 3602-Other, other travel, 3701-Toys, 3707-Musical instruments, 3708-Holidays or tours, 3709-Other recreation, 3806-Weddings, 3807-Funerals, 3808-Birthday parties, and 3709-Other Recreation).

Other

The last variable, **other2**, includes values from module 11-Personal expenses, section 40-Tobacco (**Others_1_2** questions Q_11_02_15 to Q11_02_18) and from module 14b-Non-food expenses, question Q14_d2 (**Others_2_2**: from Part B- expenses in the last 30 days, codes 1103-House insurance, 1104 to 1108-Other rent insurance and mortgages, and section 19-Stationary and drawing materials, codes 1901 to 1904, and from part D-Expenses in the last twelve months, codes 3804-Legal fees, 3805 (Property/land taxes), 3809 to 3811-Other, other services)

TOTAL CONSUMPTION AGGREGATE AND ELIMINATED HOUSEHOLDS

The total consumption aggregate is the sum of the eleven individual components described in the previous section. Estimated values for each component were aggregated and compared to the total consumption[10]. Here, the objective was to identify households with too many estimations in their consumption. A cutoff value was designated and households with estimates at or above 33.3% were considered unreliable.

Out of 2,540 households, thirty-eight had 33.3% or more of their consumption estimated and therefore were eliminated from the sample. To account for the reduction in the number of households, the sample weights were modified. To keep the total value of all the weights if a household was eliminated, its weight was distributed equally among other households within the same Primary Sampling Unit.

The average per capita consumption in June 2022 was SRD. 5,042/month. Whereas for the richest ten percent of the population the average per capita consumption was SRD. 13,370/month, for the poorest ten percent it was SRD. 1,201/month (**Table 4**).

Table 4 Average Per Capita Monthly Consumption by Decile, Suriname, 2016/17

	1	2	3	4	5	6	7	8	9	10	Avg.
June 2022 SRD	1,201	1,965	2,603	3,254	3,844	4,485	5,286	6,348	8,069	13,370	5,042

3. POVERTY LINES

New poverty lines are estimated when the household preferences and choices have changed significantly over time. In most countries in America, the same poverty lines are used for at least 15 years and new estimates are commonly introduced with changes to the survey, questionnaire, etc. If new poverty lines are estimated, all the lines from previous years must be "updated"[11]. With the new poverty line and the "updated" lines from previous years, a new poverty series can be estimated to compare poverty over time.

In Suriname, two poverty lines were constructed with the SSLC-2016/17 survey: the extreme poverty line (also known as the indigence line) and the overall poverty line (also known as the

[10] Estimated values are computed for outliers and missing observations. Use value of housing was estimated with a regression and it is not included here because it is part of the methodology and not a data quality issue. In addition, food consumed without any direct expenditure (crops produced for example) are also excluded from the estimates because the quantities were actual values reported by the household, and only reference prices were used.

[11] In this context, the term "update" refers to adjusting the poverty lines for each year, using a price deflator, typically the Consumer Price Index (CPI).

moderate line). Since the previous poverty lines were created only five years ago, it is not recommended to estimate new ones; an "update" of the previous lines is a better option.

The previous poverty line units were Per Capita/Monthly/June 2017 SDR. They were updated using the Consumer Price Index from June 2017 and from June 2022.

THE EXTREME POVERTY LINE

The extreme poverty line represents the cost of buying a food basket with the minimum caloric requirements for the average person in Surinam. To update its value, the food part of the Consumer Price Index (CPI) was used. The food CPI value for June 2017 was 139.600, and for June 2022 was 532.0041. To "update" the extreme poverty line values, the 2016/17 values were multiplied by 3.811 (532.0041/139.600).

The 2022 extreme poverty line values are SRD 1,011.00 for Great Paramaribo, SRD 954.54 for the rest of the coastal region, and SRD 787.67 for households living in the interior (**Table 5**). Households with consumption values below these lines are classified as "extreme poor".

Table 5 Extreme Poverty Line by Domain, Surinam 2017

	Domain			
(PC/Month/June 2017 SRD)	Great Paramaribo	Rest of Costal R.	Interior	Average
Extreme Poverty line/ June 2017 SRD	265.29	250.48	206.69	258.65
Extreme Poverty line/ June 2022 SRD	1,011.00	954.54	787.67	979.16

THE TOTAL POVERTY LINE

The Total poverty line is the extreme poverty line plus an additional amount that accounts for basic non-food consumption. To "update" the non-food part of the total poverty line, the Non-food CPI value for June 2017 (SRD 121.5453) and the Non-food CPI value for June 2022 (SRD 428.3957) were used. The Non-food 2016/17 values were multiplied by 3.525 (428.3957/121.) **Table 6**.

Table 6 Non-food Part of Total Poverty Line by Domain, Surinam 2017

	Domain			
(PC/Month/June 2017 SRD)	Great Paramaribo	Rest of Costal R.	Interior	Average
Non-food part/ June 2017 SRD	467.81	339.75	326.58	432.65
Non-food part / June 2022 SRD	1,648.81	1,197.47	1,151.05	1,511.18

The total poverty line values were SRD 2,659.82 for Great Paramaribo, SRD 2,152.02 for the rest of the coastal region, and SRD 1,938.72 for households living in the interior (**Table 7**). Households with consumption values below these lines are classified as overall poor or total poor.

Table 7 Poverty Lines by Domain, Surinam 2022

	Domain			
(PC/Month/June 2022 SRD)	**Great Paramaribo**	**Rest of Costal R.**	**Interior**	**Average**
Extreme poverty line	**1,011.00**	**954.54**	**787.67**	**979.16**
Non-food part	1,648.81	1,197.47	1,151.05	1,511.18
Total poverty line	**2,659.82**	**2,152.02**	**1,938.72**	**2,490.34**

4. POVERTY RESULTS

The headcount rate for the extreme poor was estimated at 2.6% of the population and the overall poverty headcount rate at 21.7%. Overall poverty is the lowest in Great Paramaribo (19.5%), slightly higher for the Rest of the Coastal Region (22.8%), and significantly increases in the Interior, showing more than one third being poor (36.9%) (**Table 8**).

Table 8 Poverty Headcount, Gap and Gap Squared (FGT), Persons, Suriname, 2022

	Great Paramaribo	Rest of Costal R.	Interior	Total
Overall Poverty (PERSONS)				
Headcount rate (P0)	19.5%	22.8%	36.9%	21.7%
Poverty gap index (P1)	0.066	0.055	0.109	0.068
Poverty gap squared (P2)	0.031	0.024	0.055	0.031
Extreme Poverty (PERSONS)				
Headcount rate (P0)	1.9%	3.2%	6.3%	2.6%
Poverty gap index (P1)	0.0047	0.0082	0.0189	0.0067
Poverty gap squared (P2)	0.0014	0.0027	0.0083	0.0023

At the household level, extreme poverty is also very low, representing only 1.1% of households. Poor households are 15.9%, with Great Paramaribo having the lowest rate (14.2%), a small increase for the Rest of the Coastal Region (16.5%) and reaching more than one quarter of households in the Interior (25.7%) (**Table 9**).

Table 9 Poverty Headcount, Gap and Gap Squared (FGT), Households, Suriname, 2022

	Great Paramaribo	Rest of Costal R.	Interior	Total
Overall Poverty (HOUSEHOLDS)				
Headcount rate (P0)	14.2%	16.5%	25.7%	15.9%
Poverty gap index (P1)	0.044	0.038	0.079	0.046
Poverty gap squared (P2)	0.019	0.016	0.037	0.020
Extreme Poverty (HOUSEHOLDS)				
Headcount rate (P0)	1.1%	1.9%	3.2%	1.5%
Poverty gap index (P1)	0.0026	0.0048	0.0080	0.0036
Poverty gap squared (P2)	0.0007	0.0015	0.0033	0.0012

As expected, the household size decreases as the per capita consumption increases. The poorest quintile averages 6.4 persons per household, decreasing to 3.6 for the richest quintile. Also, Extreme/All Poor households average 7.4/6.3 persons and the non-poor only 4.5 (**Table 10**).

Table 10 Household Size by Quintile and Poverty, Suriname 2022

	# members
Q1	6.4
Q2	5.0
Q3	5.0
Q4	4.5
Q5	3.6
Extreme Poor	7.4
All poor	6.3
Non-Poor	4.5
Average	4.9

Inequality measured by the GINI coefficient was 0.360 for the entire country. In the interior region it was 0.498; values in the Coastal Regions were lower and very similar: 0.338 and 0.335. (**Table 11**).

Table 11 Per Capita Consumption GINI by Domain, Surinam 2022

	Domain			Total
	Great Paramaribo	Rest of Costal R.	Interior	
Gini	0.338	0.335	0.498	0.360

5. CONSUMPTION AND POVERTY COMPARISONS

This is the second household survey designed to measure poverty in Surinam, and comparisons between the 2016-17 and the 2022 results are possible. The questionnaires and sampling design were kept very similar between surveys, and the institution collecting the survey and firm overseeing the work were the same. The similarities between the two surveys improves the quality of welfare comparisons. Nevertheless, there were three factors: high inflation, a new method of gathering the data -from paper to electronic-, and reduced quality controls after the data was collected, that introduced significant noise into the estimates, reducing the quality of welfare comparisons, especially those based on monetary indicators like income, consumption, or expenditure.

The 2016/17 values had to be adjusted due to an underestimation of non-bought food consumed at home. The average adjustment increased consumption by 5.9% ranging from 4.4% in Great Paramaribo up to 26.9% in the Interior Region. For a complete explanation and evaluation, see **Annex 3**. Consumption and poverty comparisons were made using the Adjusted 2016/17 values and the values from the 2022 household survey.

Comparisons of consumption components between 2016/17 and 2022 show a small decrease of 1% in average consumption (RSD 48.95) (**Table 12**). Individual components had very different change over time, with most of the groups that depended on local markets and products showing a reduction (housing, services, education, health, entertainment, and others), while consumption related to international prices and imports showing increases (transportation, communication and equipment increasing). Other components like food had moderate increases (4.1%).

Table 12 Change in Consumption Components 2016/17 to 2022, Surinam

	Per Capita/Month/June 2022 SRD		
Consumption Groups	**2016/17**	**2022**	**Change**
Food	2,087.45	2,172.63	85.18
Rent or use value of the house	772.64	388.07	(384.57)
Fuel, light, gas, and water at home	207.48	123.69	(83.79)
Education	159.88	95.99	(63.89)
Health	167.78	123.12	(44.66)
Transportation	741.51	1,023.03	281.53
Communication	251.97	330.37	78.40
Cleaning supplies, personal care, clothing, etc.	319.65	463.48	143.83
Equip., elec., furniture, glassware, etc.	36.43	66.27	29.84
Entertainment, services, games, celebrations, etc.	172.54	131.09	(41.45)
Other consumption	173.72	124.36	(49.36)
Consumption (PC/Month/June 2022 SRD)	5,091.06	5,042.10	(48.95)

It is important to note the increase in transportation consumption because it represents 20.3% of all consumption in 2022, an increase from 14.6% in 2016/17. While the 2016/17 share was in

line with the Consumer Price Index share, there are no current values to verify such an important increase.

Changes in consumption were different for the country regions. Great Paramaribo experienced a 1.4% decrease, while the Rest of the coastal region increased consumption by 3.7% and in the Interior a 6.4% increase was estimated (**Table 13**). The country average is closer to the Great Paramaribo value because over 70% of the people live there.

Table 13 Change in Total Consumption by Regions, Surinam 2016/17 to 2022

	Total Consumption (Per C./Month/June 2022 SRD)			
	1 Great Paramaribo	**2 Rest of the coastal region**	**3 Interior**	**Total**
2016/17	5,486.61	4,097.37	3,720.75	5,091.06
2022	5,412.21	4,249.80	3,958.10	5,042.10
Change in SRD	(74.40)	152.43	237.35	(48.95)
Change in %	-1.4%	3.7%	6.4%	-1.0%

Overall poverty changes in the country were not statistically significant at a p<15%. While they decreased in Surinam and in all three regions (**Table 14**), the reductions were too small to be called real changes. The poverty estimates are based on a sample of households and, as such, have a degree of precision. The precision, as measured with the confidence intervals, is reported in **Figure *1***, as the distance from the point estimate and the "whiskers"[12].

Table 14 Poverty and Extreme Poverty Headcount Changes Surinam 2016/17-2022

	Overall Poverty			Extreme Poverty		
	2016	**2022**	**Change**	**2016**	**2022**	**Change**
Great Paramaribo	22.3%	19.5%	-2.8%	0.5%	1.9%	1.5%
Rest of the coastal region	23.0%	22.8%	-0.2%	0.0%	3.2%	3.2%
Interior	38.1%	36.9%	-1.2%	5.4%	6.3%	0.8%
Surinam	23.4%	21.7%	-1.6%	0.7%	2.6%	1.9%

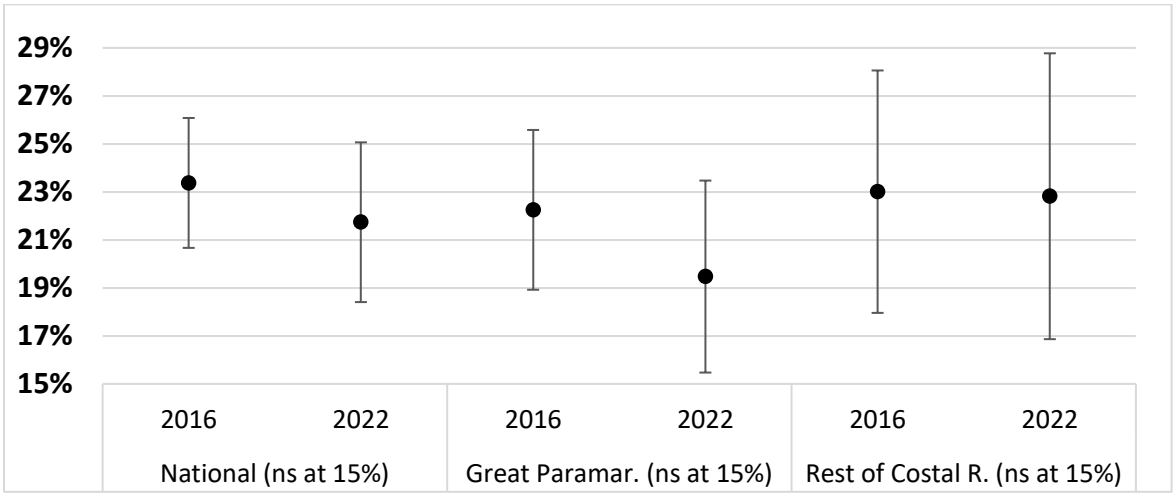
Shaded changes are significant at p<=5%

Extreme Poverty increased for the country and for all the coastal regions. Except for the Interior region, the increases were small but significant between 2016/17 and 2022. The

[12] The Stata commands used for the confidence intervals were: (1) svyset [pw= weight3], strata(stratum) psu(psu) (2) svy: mean poor_all , over(domain Year_SSLC) (3) svy: mean poor_all , over(Year_SSLC) And for the mean tests: (1) svyset [pw= weight3], strata(stratum) psu(psu) (2) svy: mean poor_all, over(Year_SSLC) coeflegend (3) lincom _b[c.poor_all@2016bn.Year_SSLC]- _b[c.poor_all@2022.Year_SSLC] (4) svy: mean poor_all, over(domain Year_SSLC) coeflegend (5) lincom _b[c.poor_all@1bn.domain#2016bn.Year_SSLC] - _b[c.poor_all@1bn.domain#2022.Year_SSLC] (6) lincom _b[c.poor_all@2bn.domain#2016bn.Year_SSLC] - _b[c.poor_all@2bn.domain#2022.Year_SSLC] (7) lincom _b[c.poor_all@3bn.domain#2016bn.Year_SSLC] - _b[c.poor_all@3bn.domain#2022.Year_SSLC]

increase was of 1.9 percentage points for the country, 1.5 for Great Paramaribo, and 3.2 for the Rest of the coastal region.

Figure 1 Poverty Headcount Comparisons Surinam 2016/17-2022



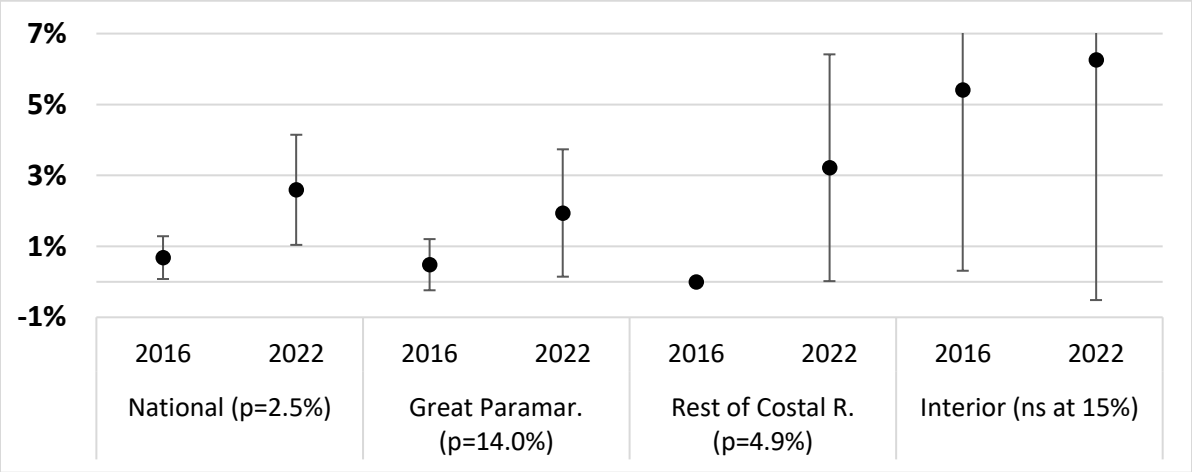
For the Interior the decrease was not significant (**ns**): 38.1% in 2016/17 and 36.9% en 2022[13]

Figure *2* shows the extreme poverty estimates for 2016/17 and 2022. The increases are statistically significant for Surinam, and the Coastal regions and not significant for the Interior region[14].

[13] The actual p values were 46.2% at the national level, 30.2% for Great Paramaribo, 96.2% for the Rest of the coastal region, and 86.6% for the Interior.

[14] The confidence intervals are estimated with a p=5%. For mean difference a laxer value of p≤15% was used.

Figure 2 Extreme Poverty Headcount Comparisons Surinam 2016/17-2022



Interior poverty was 5.4% in 2016 and 6.3% en 2022 and the increase was not significant (**ns**) with p=84.5%:

For the Interior region's extreme poverty, the confidence intervals of one year overlap the point estimate of the other year, and no statistically difference can be stablished[15].

Inequality decreased slightly in Surinam and the coastal regions over time. Between 2016/17 and 2022 the national GINI coefficient decreased 0.011 points. Inequality decreased in Great Paramaribo by 0.024 points and in the Test of the coastal region by 0.016. The Interior region experience an increase of 0.047 points. (**Table 15**).

Table 15 Changes in Consumption GINI By Domain, Surinam 2016/17 to 2022

	Domain			Total
	Great Paramaribo	Rest of Costal R.	Interior	
GINI 2016/17 adjusted	0.362	0.351	0.451	0.371
GINI 2022	0.338	0.335	0.498	0.360
Change	-0.024	-0.016	0.047	-0.011

Variations in poverty can be the product of three factors: changes in the consumption level, changes in the distribution of consumption, and the interaction of these first two factors. To evaluate the contribution of each factor, poverty changes were simulated by maintaining the 2016 consumption distribution with the 2022 average income (income factor), and by keeping the 2016 average income with the 2022 distribution (distribution factor). The interaction factor is estimated as the residual.

[15] If the confidence intervals overlap, but do not reach the point estimates, a test must be performed to determine if the difference is statistically significant.

All increases in extreme poverty are driven by changes in the distribution of consumption. The income effect did not help increase extreme poverty and had almost no impact over time. For overall poverty changes in Great Paramaribo, all the reduction is driven by changes in distribution, and income alone would have increased poverty (**Table 16**).

Table 16 Decomposition of Poverty Changes by Domain, Surinam 2016/17 to 2022

		Observed	Income	Distribution	Interaction
Overall Poverty	Great Paramaribo	-2.8%	0.6%	-3.3%	0.0%
	Rest of Costal Region	-0.2%	-2.8%	2.1%	0.5%
	Interior	-1.2%	-2.0%	-0.6%	1.4%
	National	-1.6%	-0.3%	-1.5%	0.2%
Extreme Poverty	Great Paramaribo	1.5%	0.0%	1.5%	0.0%
	Rest of Costal Region	3.2%	0.0%	3.3%	-0.1%
	Interior	0.8%	-0.5%	2.3%	-1.0%
	National	1.9%	0.0%	2.1%	-0.1%

Shaded values indicate statistically significant changes

6. ANNEXES

ANNEX 1 CONSUMER PRICE INDEX VALUES

Consumer Price Index (CPI) and Inflation by Year and Month, in Suriname, July 2021 to February 2023

Year	Month	CPI	Inflation (% change from June 2022CPI)	index (use as a multiplier) = CPI_{2022}/ CPI_i
2021	6	292.2	-35.5%	1.551
2021	7	308.8	-31.9%	1.468
2021	8	344.6	-24.0%	1.315
2021	9	349.0	-23.0%	1.299
2021	10	354.1	-21.9%	1.280
2021	11	365.7	-19.3%	1.239
2021	12	370.4	-18.3%	1.224
2022	1	381.7	-15.8%	1.187
2022	2	388.2	-14.3%	1.168
2022	3	396.7	-12.5%	1.143
2022	4	404.4	-10.8%	1.121
2022	5	415.4	-8.4%	1.091
2022	6	453.2	0.0%	1.000
2022	7	460.8	1.7%	0.984
2022	8	479.4	5.8%	0.945
2022	9	495.2	9.3%	0.915
2022	10	527.5	16.4%	0.859
2022	11	546.9	20.7%	0.829
2022	12	572.5	26.3%	0.792
2023	1	593.8	31.0%	0.763
2023	2	613.1	35.3%	0.739

* Information provided by the IADB, original data created by the General Bureau of Statistics of Suriname

ANNEX 2 RENT PAID REGRESSION RESULTS

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.537a	0.288	0.269	0.72264

a. Predictors: (Constant), q13_23d_1 Solar water heater in the house, Outskirts_interior Outskirts of Paramaribo or the interior, q13_12d_1 House with security bars in all windows, q13_23c_1 Water tank in the house, q13_15_1 Pipe water in the dwelling, q13_08_5 Outer house walls of building stones, Paramaribo Paramaribo
b. Dependent Variable: ln_rent_paid Natural logarithm of rent paid/Year/June 2022 SRDs

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	53.937	7	7.705	14.755	.000b
	Residual	133.162	255	0.522		
	Total	187.100	262			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.588	0.168		51.107	0.000
	Paramaribo	0.307	0.139	0.182	2.210	0.028
	Outskirts of Paramaribo or the interior	0.284	0.145	0.158	1.960	0.051
	Outer house walls of building stones	0.188	0.105	0.105	1.782	0.076
	House with security bars in all windows	0.369	0.105	0.216	3.506	0.001
	Pipe water in the dwelling	0.375	0.144	0.147	2.596	0.010
	Water tank in the house	0.448	0.092	0.265	4.878	0.000
	Solar water heater in the house	0.437	0.225	0.104	1.940	0.053

a. Dependent Variable: ln_rent_paid Natural logarithm of rent paid/Year/June 2022 SRDs

Residuals Statistics[a]

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	8.5882	10.7123	9.7461	0.45373	263
Residual	-2.94407	1.95478	0.00000	0.71292	263
Std. Predicted V.	-2.552	2.129	0.000	1.000	263
Std. Residual	-4.074	2.705	0.000	0.987	263

a. Dependent Variable: ln_rent_paid Natural logarithm of rent paid/Year/June 2022 SRDs

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ANNEX 3 ERRATA SHEET FOR 2016/17 CONSUMPTION AND POVERTY ESTIMATES

The 2022 consumption estimates were compared to the 2016/17 results. The comparison showed unusual differences in the food consumed at home. After reviewing the 2016/17 estimations, a problem was found in the value of non-bought food consumed at home.

For non-bought food consumed at home, the households were asked the quantities produced or received; the actual value was estimated by multiplying these quantities by the unit value of the same products reported by other households. In the original 2016/17 the estimated values did not take into consideration the frequency of consumption, nor the household size.

The frequency was then set at every week (52.18 times a year) and the average household size at 3.33 persons. When the values were estimated taking into consideration the frequency and household size, the non-food bought consumed at home value was 17 times higher than the original estimate[16]. The average increase in non-food consumed at home was SRD 79.41 per capita per/month/June 2017 SRD).

The impact on total food consumed at home (bought and non-bought) is also SRD 79.41 (per capita per/month/June 2017 SRD), ranging from SRD 64.68 in Great Paramaribo to SRD 90.81 in the Rest of the coastal region. The greatest impact is in the Interior, where most of the food producers live, with SRD 217.76 (**Table 17**).

Table 17 All Food Consumed at Home (Food_3_2) from Module 14.A (PC/Month/June 2017 SRD)

	1 Great Paramaribo	2 Rest of the coastal region	3 Interior	Total
2016/17 Original	424.75	359.89	280.33	402.51
2016/17 Adjusted	489.43	450.70	498.09	481.92
Change in 2017 June SRD	64.68	90.81	217.76	79.41

As a result of the higher values for food consumed at home, overall consumption increases by the same amount. Consumption increases an average of 5.9% in Surinam, ranging from 4.4% in Great Paramaribo up to 26.9% in the Interior region (**Table 18**)[17].

[16] The average underestimation was: 52.18/3.3333 = 15.7 times the original estimation. The difference with the actual value is due that smaller households reported higher level of non-bought food consumed at home.

[17] Small differences in changes between food and overall consumption are a result of a few households dropped from the sample and included in the food values (**Table 17**) but not in the overall consumption (**Table 18**).

Table 18 Total Consumption Changes in Surinam 2016/17 (PC/Month/June 2017 SRD)

	1 Great Paramaribo	2 Rest of the coastal region	3 Interior	Total
2016/17 Original	1,450.01	1,042.39	809.27	1,326.50
2016/17 Revised	1,514.45	1,130.98	1,027.03	1,405.27
Change in 2017 June SRD	64.44	88.60	217.76	78.77
Change in %	4.4%	8.5%	26.9%	5.9%

Poverty was re-calculated keeping the original poverty lines and using the new consumption aggregates. For households without non-bought food consumed at home, the consumption aggregate and, therefore, the poverty classification remain the same. For households with non-bought food consumed at home their consumption aggregates increased. The Increased consumption helped some households move out of poverty or from extreme to non-extreme poverty. For other households the increased consumption did not change their poverty classification because it was not big enough or because they were already classified as non-poor.

Revised overall poverty is 23.4%, a reduction of 2.8 percentage points from the original estimates (**Table 19**). Revised extreme poverty is 0.7%, a reduction of 1.0 percentage point. Most of the changes concentrate in the Interior where overall poverty decreases from 47.9% to 38.1 percent, and extreme poverty is reduced to almost a third from 15.7% to 5.4%. Since food produced at home is the most important source of non-bought food, it is not surprising that the bigger impact is in the Interior region of the country, especially on extreme poverty.

Table 19 Poverty and Extreme Poverty Headcount, Original and Adjusted, Suriname, 2016-2017

	Great Paramaribo	Rest of Costal R.	Interior	Total
Overall Poverty (PERSONS)				
Headcount rate (P0) Original	23.7%	28.3%	47.9%	26.2%
Headcount rate (P0) Revised	22.3%	23.0%	38.1%	23.4%
Change in percentage points	-1.5%	-5.3%	-9.8%	-2.8%
Extreme Poverty (PERSONS)				
Headcount rate (P0) Original	0.5%	1.8%	15.7%	1.7%
Headcount rate (P0) Adjusted	0.5%	0.0%	5.4%	0.7%
Change in percentage points	0.0%	-1.8%	-10.2%	-1.0%

Also, the GINI coefficient changes because of the adjustment applied to the non-bought food consumed at home. All GINI estimates are lower after the adjustment. The biggest reduction is also for the Interior, and the smallest is in Great Paramaribo. For the country, the GINI decreases by almost 0.01 points (**Table 20**).

Table 20 Changes in the Per Capita Consumption GINI by Domain, Surinam 2016-2017

	Domain			Total
	Great Paramaribo	Rest of Costal R.	Interior	
GINI Original	0.366	0.360	0.473	0.381
GINI Adjusted	0.362	0.351	0.451	0.371
Change	-0.004	-0.009	-0.022	-0.009

A new set of 2016/17 data files were created with the adjusted values. The new data file names had the term "_revised" added at the end. For example: "2018_SSLC_01_to_11_Persons.dta" is now "2018_SSLC_01_to_11_Persons_revised.dta".