Poverty Measurement for Refugees in Jordan

VAF Welfare Study - A Technical Note¹

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Abstract

The technical note describes the method of computing the consumption aggregate and measuring poverty among refugees in Jordan using the 2021 Vulnerability Assessment Framework (VAF) Population Survey. It is the first attempt to measure poverty using a standard consumption module for refugee populations in the MENA region. It adopts the most recent recommendations by Mancini and Vecchi in 2022 and estimates poverty incidence using the cost of basic need approach. The food poverty line, which is common for camp and out-of-camp refugees, is estimated at 17 JOD per capita per day, resulting in 16% and 45% food poor in camp and out-of-camp respectively. The absolute poverty line for both camp and out-of-camp refugees after estimating the in-kind benefits that refugees living in camps receive (such as shelter, water, and electricity) is 81 JOD. Using this poverty line, the headcount poverty rate for all refugees is 57%, the headcount poverty for refugees living outside camps is 60%, and for refugees living in camps is 45%. Using the \$5.5 international poverty line, the poverty rates for all refugees is 66%, the poverty rate for refugees living outside the camp is 68%, and the rate for those living inside the camp is 59%. This exercise suggests that the incidence, depth, and severity of out-ofcamp poverty is relatively higher as compared to camps, after valuation of the in-kind assistance - shelter, water and electricity provided in camps.

*This report should be cited using the following referencing style: Chinedu Temple Obi 2023, UNHCR Jordan, World Bank 2023. Poverty Measurement for Refugees in Jordan.

¹ This note is based on a Joint Data Center (JDC)-funded World Bank/UNHCR project 2021-2022, "Strengthening evidence for the benefit of host communities and refugees in Lebanon, Jordan, and the Kurdistan Region of Iraq." The project was supervised by Silvia Redaelli and Johannes Hoogeveen. The author acknowledges the support of UNHCR colleagues, including Maria Eirini Lagourou, who coordinated the fieldwork. Other UNHCR team members include Alexander Tyler, Oliver Smith, Kaleem Ur Rehman, Bram Dekker, and Aimee Kunze Foong. Thanks to the two reviewers - Minh Cong Nguyen and Elizabeth Mary Foster, who provided valuable technical suggestions on the earlier version of the note. ² MENA Poverty Unit

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1 INTRODUCTION

UNHCR Jordan has been collecting individual and household-level data about refugees as part of its mandate to protect refugees. The Vulnerability Assessment Framework Population Survey conducted in 2021 has an extensive consumption module that allows estimating poverty following the cost of basic needs approach (CBN). Verme et al. (2014) made the first attempt to incorporate a welfare (expenditure) approach in the calculation of poverty among Syrian refugees in Jordan in 2014. The approach comes with several limitations, however. Apart from the outdated estimates, it omits non-Syrians and Syrians residing in refugee camps. Most importantly, the consumption aggregate is truncated as the expenditure module is based on a collapsed list of only ten items. According to Christiaensen et al. (2022) and Beegle et al. (2012), using such short consumption modules vastly underestimates household consumption and overestimates poverty.

The current poverty measurement exercise is the first to calculate poverty among refugees using a large set of consumption items based on the newest measurement approach recommended by Mancini & Vecchi (2022). The second section of this paper outlines the survey instrument, sampling, and weight calculation. The third section explains the steps and assumptions used in constructing the consumption aggregate, including spatial price deflators and poverty lines. The final section presents the key lessons from this exercise.

2 SURVEY INSTRUMENTS, SAMPLING, AND WEIGHTING

The primary source of data for the poverty measurement is the fifth Vulnerability Assessment Framework (VAF) Population Survey. The survey was collected face to face over sixteen weeks between the dates of 5 July 2021 and 9 October 2021 for out-of-camp refugees and between 7 October 2021 and 19 December 2021 for camp refugees. (UNHCR, 2022)³.

³ Efforts to integrate a standard consumption model into the VAF survey started in 2020. The project seeks to foster collaboration in collecting data and building targeting models. Using UNHCR admin and VAF data, the project also aims to construct a Proxy Means Test (PMT) for targeting refugees that are eligible for cash assistance. Toward this goal, UNHCR and the World Bank team worked jointly to harmonize and update new data collection efforts to enhance information on poverty and vulnerability. The World Bank provided technical assistance to the UNHCR team, advising on (i) sampling and (ii) including a consumption module developed from the Government of Jordan's (GOJ) Household Income and Expenditure Survey (HIES) and (iii) the development of PMT model.

2.1 SAMPLING PROCEDURE

The sampling frame used for the VAF survey is based on the ProGres database. The ProGres database contains the most up-to-date statistics of registered refugees in Jordan, including those living inside and outside camps. A representative sample of registered refugees by nationality was collected. A stratified sampling strategy was developed and used for both out-of-camp and camp refugee samples. For the out-of-camp refugees, the stratification procedures were based on the refugee's nationality and governorate of residence. The strata included Syrian, Iraqi, and other nationalities from all 12 governorates. Refugee households within each governorate were first grouped according to the three nationality groups, then a probability proportional to size (PPS) method was used to select cases to interview.

There are, however, few refugee nationalities present in some governorates. For instance, 80 percent of Iraqi refugee households are hosted in Amman (n = 29,464), whereas the governorates of Al Karak, Al Tafilah, and Ma'an host fewer than 50 Iraqi refugee households. As a result, governorates with small refugee populations were oversampled. In total, 36 strata were developed, representing three nationalities multiplied by 12 governorates. The survey is representative of registered refugees at the governorate level and refugee nationalities at the national level.

For camp sampling, the two largest refugee camps, Azraq, and Zaatari, which host only Syrian refugees were selected. Each camp was stratified based on districts within the camp, 4 villages in Azraq and 12 districts in Zaatari, respectively. The selection of refugee households was based on the probability proportional to size (PPS) criteria.

The out-of-camp and camp sampling structures are shown in Tables 1 and 2, respectively. Overall, 10,765 cases completed the survey, of which 8557 reside outside, and 2208 reside within the camp.

Governorate	Case Nationality	Number of refugees case	Sample size	Number of cases interviewed
Amman	Syrian	60826	1200	1245
AlBalqa	Syrian	5103	350	354
Madaba	Syrian	3415	350	341
Zarqa	Syrian	13942	600	605
Ajloun	Syrian	1745	300	308
Irbid	Syrian	39682	700	735
Jerash	Syrian	2620	350	354
Mafraq	Syrian	22118	700	720
AlKarak	Syrian	2363	350	380
Aqaba	Syrian	1100	350	368
Maan	Syrian	2175	350	361
Tafila	Syrian	448	200	204
Amman	Iraqi	26278	600	622
AlBalqa	Iraqi	930	159	186
Madaba	Iraqi	415	71	75
Zarqa	Iraqi	990	170	179
Ajloun	Iraqi	25	15	10
Irbid	Iraqi	328	98	100
Jerash	Iraqi	27	15	8
Mafraq	Iraqi	337	98	120
AlKarak	Iraqi	56	32	21
Aqaba	Iraqi	43	25	12
Maan	Iraqi	30	20	8
Tafila	Iraqi	5	5	3
Amman	Others	11439	400	510
AlBalqa	Others	258	70	70
Madaba	Others	163	44	41
Zarqa	Others	542	146	134
Ajloun	Others	16	8	6
Irbid	Others	422	125	72
Jerash	Others	35	15	18
Mafraq	Others	268	80	59
AlKarak	Others	180	36	30
Aqaba	Others	329	66	81
Maan	Others	857	173	187
Tafila	Others	119	24	30
Total		199629	8295	8557

Table 1: Sampling size - Out-of-camp refugees

Camp	Location	Case Nationality	Number of refugees case	Sample size	Number of cases interviewed
Azraq	2	Syrian	1622	176	188
Azraq	3	Syrian	2195	238	261
Azraq	5	Syrian	1854	201	218
Azraq	6	Syrian	1707	185	197
Zaatari	1	Syrian	1343	107	123
Zaatari	2	Syrian	1340	107	121
Zaatari	3	Syrian	996	80	88
Zaatari	4	Syrian	920	74	80
Zaatari	5	Syrian	1106	89	103
Zaatari	6	Syrian	1470	118	126
Zaatari	7	Syrian	1219	98	105
Zaatari	8	Syrian	1768	141	158
Zaatari	9	Syrian	1065	85	93
Zaatari	10	Syrian	1172	94	99
Zaatari	11	Syrian	1539	123	136
Zaatari	12	Syrian	1057	85	112
Total			22373	2000	2208

Table 2: Sampling size - Camp refugees

2.2 WEIGHTING

A general weight formula below was applied:

$$W_{final} = W_{sel} \times W_{nr} \times W_{ps}$$

Where *sel* represents the probability of selection, given as the sample size divided by the total population in each stratum, and *nr* represents the non-response rate, given as the ratio of the intended sample size and the actual sample collected. Note that cases with zero or missing food consumption values and families not registered with UNHCR were dropped before re-weighting. *ps* represents post-stratification, the calculated population size over the total actual population. The total population of registered refugees as of November 2021 was used for the post-stratification correction. According to proGres data, 759,738 refugees were active cases as of November 2021, of which 82.8 percent reside outside the camps. In general, as shown in Tables 1 and 2, the actual sample size in some strata is larger than the intended sample size. This is because additional surveys were conducted in these areas to complement the insufficient number of surveys collected in others.

2.3 VAF QUESTIONNAIRE DESIGN

In addition to the core VAF modules, such as WASH, shelter, food security, coping strategies, financial situation, documentation, health, education, and livelihoods, and modules related to COVID, a consumption module was added, which is a subset of items included in the 2018 GoJ's HIES. To avoid overloading the questionnaire with too many consumption items, the following approach was applied: a sub-category consumption approach where the most important items consumed by the poorest non-Jordanians (bottom 20%) were selected from the HIES. To do this, a ranking of the items consumed by the poorest non-Jordanians at sub-category levels was conducted. Then, from each sub-category, the top items in terms of share to total food consumption and the number of households consuming the items were selected. Two consumption modules were constructed – a short and a long form (also called an instrument). There are 62 items in the short form and 96 items in the long form (Table 3). Seventy-five percent of randomly selected sampled cases in each location (governorate or camp) completed the short survey form, while the remaining 25 percent completed the long survey form. Ultimately, the VAF consumption model (long model) represents a subset of the GOJ's 2018 HIES, covering items that account for approximately 90 percent of the total consumption of the poorest non-Jordanians.

Food consumption data were collected through a recall method by asking households how much food they consumed in the last seven days before the interview. The food consumption module is administered in two steps. First, for each item, three leading guestions are asked to assess whether any household member 1) consumed a food item, 2) purchased a food item, or 3) received a food item as humanitarian aid or in-kind assistance in the seven days prior to the interview. In the second step, for items to which the answer was yes in any of the lead questions, follow-up questions are asked to determine how much is consumed, purchased, or received as humanitarian aid. The long form also asked how much the household paid in local currency (JOD) for the item purchased and the number purchased in units. To assist the respondents in recalling quantities of food purchased or consumed, a food photo was provided that displayed different types of food packaging and their corresponding equivalents in kilograms or other relevant units. The non-food consumption module has different recall periods depending on the sub-category. For instance, transportation, communication, and personal care items have a one-month recall period; clothing and footwear have an annual recall period, while housing and utilities have an open frequency ranging from daily to annual.

The consumption modules for camp and out-of-camp populations are near identical, with a few exceptions. Both surveys contain items from all sub-categories included in the HIES,

and recall periods are similar, except that the out-of-camp module does not have durable items. Nevertheless, durable items such as generators, water tanks, solar lamps, and solar panels were included in the camp module. If the share of the durable items to the total consumption of the camp model is large, it may affect the extent to which the camp consumption aggregate compares to the out-of-camp aggregate. However, as shown later, the durable items contribute less than 1 percent to the total consumption of the camp refugees, and their impact is negligible.

Category	Sub-category	Short	Long
Non Food	Cleaning materials	1	2
	Clothing and footwear	1	3
	Education	1	4
	Health	2	3
	Housing, water, electricity,	7	8
	and gas		
	Personal care	5	11
	Transport and communication	2	4
	Tobacco	1	1
	Other	1	2
	Durables (Camp only)	4	4
	Total	25	42
Food	Fruit and vegetables	11	16
	Grains and products	5	6
	Proteins and fats	12	16
	Beverages, spices, sweets	8	10
	Meals in Restaurants	1	6
	Total	37	54
Total		62	96

Table 3: Number of items in long and short survey forms

3 CONSUMPTION AGGREGATES: STEPS AND ASSUMPTIONS

The same procedure was adopted in calculating the consumption aggregate for refugees living out of camps and refugees living in camps. Data cleaning decisions and assumptions were the same. However, depreciation of durable goods was unnecessary for the out-of-camp model because the questionnaire did not include durable goods. In the out-of-camp model, where essential utilities like electricity and water are missing or reported as zero, they were imputed using the governorate median values. For housing, a hedonic pricing method was adopted. These essential utilities – electricity, water, and housing - are provided in kind in the camp. They were valued using a special method (see section 3.5). Table 4 below summarizes the main methodological assumptions applied to the two models.

Table 4: Composition of	the consumption	aggregate
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OUT-OF-CAMP calculation	CAMP calculation
1) Components of the aggregate: Food	1) Components of the aggregate: Food
• Food consumption (Long: 54 items; Short 37 items)	• Food consumption (Long: 54 items; Short 37 items)
• Food away from home (Long: household level, 6 items detailed by breakfast, lunch, snack, and dinner; Short: household level, 1 question)	• Food away from home (Long: household level, 6 items detailed by breakfast, lunch, snack, and dinner; Short: household level, 1 question)
• Food component = Quantities consumed x unit price for purchase x 52.143	• Food component = Quantities consumed x unit price for purchase x 52.143
2) Components of the aggregate: Non-food	2) Components of the aggregate: Non-food
 Non-food expenses (Long: 38 items; Short 21 items) 	 Non-food expenses (Long 42 items; Short 25 items)
Housing- Imputed rent estimated using a Hedonistic	No rent.
 One model with a dummy for the area of residency – governorates, rural, and other household characteristics. 	 Rent was missing for all camp households because it was provided in-kind. It was valued from the minimum rent received by households that rented their shelter with some adjustments
No durable goods	 No electricity cost Electricity was imputed using the average cost of electricity per household in each comp
	Camp No water cost
	 No water cost Water expenditure was imputed using the average cost of water per household outside the camps
	• Use value of durable goods (4 items)
	 Use-cost approach assuming straight-line depreciation
2) Exclusions:	2) Exclusions:
 Lumpy items, e.g., event expenses and undefined miscellaneous expenses 	Lumpy items, e.g., event expenses and undefined miscellaneous expenses
3) Missing and Outliers' processing	3) Missing and Outliers' processing
Processed before aggregation	Processed before aggregation
 Missing electricity and water expenses were imputed using the governorate median Outlier imputation by the governorate median if > (2) 	• Outlier imputation by the governorate median if > $(2x 99^{th} percentile) or (< \frac{1}{2} x 1^{st} percentile)$
 Outlier imputation by the governorate median in 2 (2x 99th percentile) or (< ½ x 1st percentile) Outlier adjustment after subtracting cash assistance: winsorization by replacing with the maximum value of the 2nd percentile 	• Outlier adjustment after subtracting cash assistance: winsorization by replacing with the maximum value of the 1st percentile
4) Nominal Aggregate	4) Nominal Aggregate
Aggregate =Total expenditure / (sharing size*)	Aggregate =Total expenditure / (sharing size)
5) Survey Instrument-Adjusted Aggregate	5) Survey Instrument-Adjusted Aggregate
 Long and short model differences were adjusted by inflating the short aggregate with a correction factor 	 Long and short model differences were adjusted by inflating the short aggregate with a correction factor
6) Time and spatial deflator	6) Time and spatial deflator
Spatial: Adjusted total expenditure /deflator	Spatial: Adjusted total expenditure /deflator
Temporal: none	Temporal: none

* A detailed explanation of sharing size is presented in section 3.1

3.1 UNIT OF ANALYSIS

Identifying a unit of analysis for constructing poverty models for the refugee population is tricky. In most UNHCR surveys, refugee samples are drawn from the ProGres dataset.

ProGres assigns individuals to *cases*, which differs from the *household* unit used in traditional survey methods. A case refers to a group of individuals, usually a family, that UNHCR considered jointly for specific purposes, including status determination or resettlement. Assistance targeting is done at the case level, and the amount of assistance received is determined by the number of individuals in the case.

On the other hand, a household is described as a group of "people who eat from the same pot," pooling resources together for mutual support. Often, cases, families, and households are the same; however, as refugees move, marry, or adapt, they may no longer live under the same roof and share the same resources. In Jordan, for example, as a coping strategy, different refugee cases could be living together under the same roof outside the camp, with some sharing resources and "eating from the same pot," while others do not.

As a result, there are some complications when analyzing poverty at the case or household level. When different cases live together, a "case" level computation will not consider resource pooling, as each case would be treated as a separate household. On the other hand, a "household" level computation, which aggregates all cases into a single household unit, requires the assumption that there is complete pooling of resources. However, this assumption may not always hold because there are some instances where different cases living under one roof do not share or eat from the same pot. If cases under one roof do not share or eat from the same pot. If cases under one roof do not share food and the household is adopted as the unit of analysis, there may be bias against the poorer case. This is because the consumption aggregate for each case in the household would be the average household consumption aggregate. This average may likely inflate the nominal consumption of the poorer case. According to UNHCR colleagues, this bias has led to instances where the previous targeting model does not pick highly vulnerable cases who live with others.

Box 1: Basic definitions of household and sharing size

A case refers to a group of individuals, usually a family, that UNHCR considered jointly for specific purposes, including status determination or resettlement.

A household is a group of people living together who may or may not eat from the same pot, pooling resources together for mutual support.

A sharing group is a group of cases or individuals living under one house and pooling resources (sharing meals and expenses) for the benefit of all.

For this purpose, a new unit of analysis called the sharing group or sharing size was created. A sharing group is a group of cases living under one house and pooling resources (sharing meals and expenses) for the benefit of all. Household members who share the house but do not share food become a separate sharing unit. The questionnaire asks how sharing takes place, allowing to disentangle this. For example, if two cases (families) live together, both buy food and share it mutually, they are considered as one household (or sharing unit). Here, they will fill out only one consumption questionnaire, and the consumption aggregate for each case will be the total household consumption divided by the number of sharing sizes. However, suppose that while living together, they do not share food; each case would complete their consumption questionnaire as if they were a separate household. Assuming that there are three-case households, two cases pool their resources together, and one is entirely independent. Then, two consumption questionnaires will be completed, one for the two cases pooling resources (i.e., sharing food) and another for the independent case.

3.2 FOOD AGGREGATE

The food module sub-aggregate includes fruits and vegetables, grains and products, proteins and fats, beverages, spices, sweets, and food away from home. The short form has 37 food items, while the long form contains 54. In the long form, composite food consumed away from home consists of six items: hummus and falafel, snacks, breakfast, lunch, dinner, and external orders (pizza, pita, pasta, etc.). In the short form, however, only one composite question was used to enquire about the total amount of food consumed away from home during the 7-day reference period.

The food module includes questions about the consumption (quantity of food consumed) and acquisition (food purchased and food received as gifts). Traditional food consumption modules ask questions about acquisitions as a follow-up to a leading question on food consumption. For example, respondents would be asked whether they consume each food item on the food list. If yes, further questions regarding purchases, own production, or in-kind consumption would be asked. Then, the total consumption would be the sum of values from production, purchase, and gift. The VAF consumption survey was different, as both consumption and acquisition questions served as filter questions (Table 5). Considering how the food consumption module was designed, either consumption or purchase (expenditure) may be used for poverty measurement. As of the time of data collection, very few humanitarian agencies provide in-kind food assistance, and very few respondents indicate they have received in-kind food assistance.

Consumption was selected as the primary welfare metric for the poverty measurement. The main difference between consumption and expenditure comes from the level of stocks and food wasted in households. Because daily food consumption is more regular and smoother than expenditures, the variance when using expenditure is often higher. It is expected that as the length of the survey recall period increases, the difference between expenditure and consumption will decrease. However, a seven-day recall period was used, which is too short to see a smoother distribution of expenditures. One may argue that refugee households are poor and are not expected to have large food stocks or to waste much food. However, most refugees in Jordan rely on food vouchers or cash transfers from the World Food Programme (WFP), and they are likely to purchase food in bulk when they receive these vouchers. They may report higher expenditure (but not necessarily consumption) if they are surveyed shortly after receiving food vouchers. By using only the consumption value, one avoids skewing the poverty calculation.

Table 5: Food model structure

Filter questions	Condition	Value question
Did anyone in the household/sharing group consume [items] during the 7 days that precede the interview?	lf yes, ask	How much {item} did the household/sharing group <u>consume</u> during the 7 days that precede the interview?
Did anyone in the household /sharing group purchase [items] during the seven days that precede the interview?	lf yes, ask	How much {item} made the household/sharing group <u><i>purchase (JOD)</i></u> during the 7 days that precede the interview?
Did anyone in the household/sharing group receive [items] as humanitarian aid or in-kind assistance during the 7 days that precede the interview?	lf yes, ask	How much {item} did the household/sharing group <u>receive</u> as humanitarian aid or in-kind assistance during the 7 days that precede the interview?

3.3 VALUATION OF FOOD

The unit value (total payment divided by the number of purchased units) was used to measure food value. In the 2021 VAF, only one price vector was collected - the total purchase price for each food item purchased. Thankfully, all food items were collected in standard units - kilograms, grams, or numbers, and purchase prices were collected in local currency (JOD). Some households reported consumption during the reference period but did not purchase. Thus, the median unit values from households in the same governorate that purchased the item were used to impute the unit value of households that did not purchase. The standard practice for aggregating the unit values is to take the median price over the smallest administrative unit for which data are available. The governorate level was selected because a sufficient number of observations (n>50) was found at this level. Additionally, food prices did not differ significantly at the lower administrative level (district). In order to check the accuracy of the unit values within the governorate, a density

distribution graph was plotted (Figure 1). The graphs for the food items are unimodal and exhibit low variance.

One challenge is that the question about the purchase unit was only asked in the long form. Consequently, the governorate median unit value of each item from the long form was used in the short form. Where the short-form food item is a collapsed version of the long-form items, the median unit price of the associated long-form items was used.



Figure 1: The density function of the unit value of selected food items

NB: This is the density function of selected food items from out-of-camp refugees living in Amman governorate that completed the long survey form.

3.4 NONFOOD AGGREGATE

There are 42 non-food items in the long form and 25 in the short form. The non-food module includes cleaning materials, clothing and footwear, education, health, housing, water, electricity and gas, personal care, transportation and communication, and tobacco. As recommended by Mancini and Vecchi 2022, miscellaneous/special events items were

dropped from the consumption aggregate. These items qualify as lumpy items⁴, and their expenditures are likely to occur occasionally. Furthermore, health expenditures like medicines and hospital costs were included in the consumption aggregate. For the most part, the non-food calculation is straightforward. The principal question was, "How much in total did all members of this sharing group pay for [non-food item] during the last [recall period]?". Households that did not purchase the item recorded zero or missing data. As reported earlier, imputed values were used for essential non-food items, e.g., electricity, water, and housing (hedonic regression), where they are unavailable.

3.5 VALUING IN-KIND ASSISTANCE FOR CAMP REFUGEES

The camp respondents did not report values for rent, water and electricity which are provided in kind. Given that these items are essential to welfare, they were estimated and included in the camp consumption aggregate. The assessed value of rent in the camp was estimated using the minimum value of rent (75 JOD per month) and adjusting the value using an assessment rate⁵. The assessment rate is a value (in percentage) estimated from the condition of the dwelling. These conditions include if there is a makeshift extension on the dwelling, if it has solar lamp, a concrete floor, the conditions of roof, wall, door, electrical connection, light and ventilation, etc. A point is awarded if the dwelling has the listed facility and zero otherwise, and the mean is the assessment rate. The cost of electricity was estimated from the average electricity consumption provided by the camp administrators. The cost of water was estimated using the mean monthly cost of water outside the camp. The result of these estimations is provided in Table 6. The average per capita consumption in camp increased from 68 JOD to 92 JOD after the inclusion of estimated rent, cost of water and electricity.

	Out of camp	Camp
Rent per capita	25.9	17.8
Water cost per capita	1.5	1.3
Electricity cost per capita	3.5	4.2
Per capital consumption (as it is)	87.0	68.4
Per capita consumption (plus estimated rent water and electricity) in camp	87.0	91.7

Table 6: Estimated pe	r capita cost	of rent, water,	and electricity in	camp
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⁴ Lumpy items are infrequent expenditures (e.g., weddings, funerals, purchase of durable goods e.g. cars), which are typically very large with respect to the total budget of the household and are often anticipated or planned for.

⁵ Camp refugees live in caravan – a pre-fabricated structure made from shipping containers. According to the camp administrators, refugees sometimes rent their caravans through an informal market. The monthly rent ranges from 75JOD to 150JOD per month depending on the condition of the caravan.

3.6 VALUING MISSING HOUSING FOR OUT-OF-CAMP REFUGEES

Rent is an essential consumption item for refugees living outside of camps. Almost all refugees (93 percent) living outside camps pay rent, and only 7 percent recorded zero rent. In order to calculate the cost of housing, actual rent was used for those who reported rent, and hedonic regression was used for those who did not report rent. The hedonic regression regresses the logarithm of the actual rent paid by renters on a variety of dwelling characteristics, as shown below.

$$ln rent_h = \beta x_h + \varepsilon_h = \beta_0 + \beta_1 x_{1h} + \dots + \beta_k x_{kh} + \varepsilon_h$$

Where In rent is the logarithm of actual rent paid by household h, xh is a vector of k characteristics of household h's dwelling (x1 being the first regressor, all the way to the k-th regressor, xk), and εh is the error term. In our model, the regressors include the number of rooms, types of shelter, if the shelter has a kitchen and bathroom, if the roof condition is satisfactory, the electrical condition is satisfactory, opening conditions, rural location, and the governorate. The model is estimated on the renter population, and regression coefficients are used to predict rent for those with missing rent.

Predicted rent is used only for households without rent expenditures. Mancini and Vecchi 2022 suggested that even though the dependent variable in the hedonic model is the logarithm of rent, the correct expected value of rent should not simply be derived from its exponential. They contend that this naïve retransformation is incorrect and may systematically underestimate average rent. Therefore, they provided several options for transformation, including Duan's smearing estimator, a two-stage Heckman correction, and the GLM method. After comparing the results from the naïve, Duan's smearing estimators, and the GLM method, the GLM method was selected because it shows the least difference between actual and predicted rent. The result of the hedonic regression is shown in the annex.

3.7 VALUING DURABLE ITEMS FOR CAMP REFUGEES

Recall that durable items were only included in the camp model. These items include generators, water tanks, solar lamps, and solar panels. In practice, the use-value of durable goods should be considered rather than the total purchase price. There are three main methods to calculate the use-value of durable goods: the acquisition approach, the rental equivalence approach, and the user cost approach. Each method needs information on the item's age and depreciation rate. Unfortunately, neither the date of purchase for these items nor the rental equivalent was included in the VAF survey. Secondly, since these durable items were not included in the GOJ's HIES, there is no information on their depreciation rate. When this problem arises, it is usually recommended not to include durable items in the consumption aggregate. However, the presence of these durable items in a refugee camp can help identify wealthy refugees. To calculate the value of the four durable items, a straight-line depreciation method - assuming a 10-year useful life with no salvage value was used⁶. While there is an understand that this is the most naive method for depreciation calculation; however, as shown in Figure 3, the value of the durable item is very insignificant, contributing less than 1 percent to the total consumption aggregate in the camp model.

3.8 PRICE ADJUSTMENT

A price adjustment may be necessary when prices change over time and space due to inflation, seasonal changes, or the cost of living. Temporal deflation was not computed because the surveys were completed within three months. However, the consumption model requires spatial price deflation since some governorates, such as Aqaba, Maan, and Amman, have higher living costs than others, and the two camps may also have different costs of living. The Paasche index was used to take into account these price variations.

Paasche price index
$$P^h = \left(\sum w_k^h \frac{p_k^0}{p_k^h}\right)^{-1}$$

Where w_k^h is the share of food k in the household's total food consumption expenditure, and $\frac{p_k^0}{p_k^h}$ is the ratio of the national price and local price of food k. In order to smooth the unit value estimates, the price of item k purchased by household h is proxies by the median unit value for item k at the governorate level.

Non-food items were excluded from the spatial deflators because the quantity purchased, which is necessary for calculating spatial deflators, was not asked in the questionnaire. The food spatial deflator is then used to deflate total consumption.

⁶ While the methodology used to calculate the use value of durable goods is reasonable considering the scarce data available, it would be better to expand the list of durable goods to include more commonly owned items in future exercises, both in camp and out-of-camp. The complete list of questions needs also to be asked to calculate use value using the standard method.





3.9 CONSUMPTION AGGREGATE

For each survey form, long and short, a sub-aggregate consumption value was created by summing all consumption items within each sub-category, e.g., food, health, education, etc. Recall that there were different recall periods at the sub-aggregate level. The sub-aggregate values were annualized by multiplying with appropriate conversion factors. For instance, the food sub-aggregate has a reference period of 7 days. The annual food consumption was calculated by multiplying the total value of food consumed during the reference period by 52.1429 (i.e., 365/7), the number of weeks in a year. Non-food sub-aggregate with 6 months recall period were multiplied by 2; those with a 3-month recall period, were multiplied by 4, etc. After the annualization, the sub-aggregate values for the two survey instruments were merged into one dataset. A nominal consumption per capita per month was then calculated by dividing the sum of the annualized consumptions by 12 and dividing it by the sharing size. Refer to section 3.1 for detailed discussion of the differences between the sharing size and the household size.

A real consumption aggregate was calculated by applying a spatial deflator. The share of consumption items to the total consumption after deflation is shown in Figure 3. Unlike typical consumption results, where food expenditure constitutes the highest share of the total consumption of the poor population, rent topped the list for the out-of-camp refugee population, and food expenditure came second. This result may be explained by the high cost of rent in Jordan, especially since most refugees live in Amman, where rent is

exceptionally high. Besides, this result was confirmed by UNHCR colleagues, who explained that rent had been the highest expenditure in the previous VAF surveys. Another noticeable occurrence is the high share of expenditure on health. This could be explained by the fact that the survey was conducted during the Covid-19 pandemic, which may likely increase the number of households seeking medical care.





*Camp did not include the estimated rent, water, and electricity

The survey instrument-adjusted consumption aggregate was calculated to correct the differences between the two survey instruments – short and long. This is necessary since the average consumption aggregate from the short form is significantly lower than the long-form aggregate, thus confirming Beegle et al (2012)'s finding that the length of the consumption module matters. Secondly, the short and long consumption aggregates have different distribution patterns, which became similar after a correction factor was applied. To adjust for the survey instrument, the following correction factor was applied:

$$CF_{ith} = \frac{\alpha_{ith}}{\beta_{ith}}$$

Where α_{ith} is the mean of deflated consumption aggregate at each percentile in the long form. β_{ith} is the mean of deflated consumption aggregate at each percentile in the short

form. The survey instrument adjusted consumption aggregate was then calculated by inflating the consumption aggregates for all households that completed the short form using the:

Short-form adjustment = $\theta_{ith}^{h} * CF_{ith}$

Where θ_{ith}^{h} is the deflated consumption aggregate of a given household that completed the short form with a consumption aggregate at the ith percentile. CF_{ith} is the correction factor at the ith percentile. After the correction has been applied, a t-test analysis shows no significant difference in consumption aggregate for the short and long forms.



Figure 4: Distribution plot of different consumption aggregate (long and short)



Figure 5: Distribution aggregate of different consumption aggregate after adjustments

Figure 5 illustrates the distribution of per capita consumption aggregates for camp and out of camp population after adjustments and imputations. The distribution of camp dwellers is narrower than that of out-of-camp refugees, suggesting that the welfare distribution in the camp is more homogenous.







3.10 MISSING OBSERVATIONS AND OUTLIERS

Most of the missing observations and outliers' adjustments were made before aggregation. Generally, households that selected "No" in the filter food consumption question "did you consume" were automatically recorded as having no consumption value for that item. Adjustments were not made. Other households that selected "Yes" also reported the value of their consumption; as such, missing items did not present a serious problem in the food module. In order to deal with missing values for non-food expenditures, two different methods were employed. The governorate median values were used to impute missing values for essential items like water and electricity for refugees living outside of the camp. As explained previously, missing values for rent were imputed using predicted values from hedonic regression. Outlier adjustments were made for extreme values for each consumption item. For each unit value calculated, a value is considered abnormally large if it exceeds twice the 99th percentile value. In contrast, it is considered abnormally low if it is less than half the first percentile. Adjustments were made by replacing these values with the governorate median for out-of-camp and camp median for camp.

4 **POVERTY LINES**

4.1 COST-OF-BASIC-NEEDS POVERTY LINE

The Cost-of-Basic-Needs (CBN) poverty line approach was adopted, and it is based on the cost of a basket of food consumed by the poor that provides enough calories, plus an allowance for non-food needs (Mancini & Vecchi, 2022). The poverty line is calculated using the real consumption aggregate -i.e., the spatially deflated consumption aggregate to account for differences in the cost of living. The idea is to get the estimates of household consumption expenditure required to obtain the minimum required calories. Consistent with other poverty estimates, 2300 calories per capita per day was adopted as the minimum requirement for both camp and out-of-camp populations.

Due to the differences in the consumption distribution of camp and out-of-camp refugees, three options were adopted to calculate the poverty line of the two groups.

- In option 1, the food and non-food components of the poverty line are assessed separately for refugees living in the camp and those living outside the camp. This option make allowance for a possible difference in the cost of food basket of camp and out-of-camp population. This allowance may however be unnecessary if the cost of the book basket in camp and out of camp are similar.
- In option 2, the food component of the poverty line is calculated jointly for the camp and the out-of-camp populations, while the non-food allowance is calculated separately. This option allows a comparison of food poverty levels between the camp and out-of-camp populations, but not the absolute poverty levels.
- In option 3, the food and non-food components of the poverty line are assessed jointly. This option is only possible after the valuation of the rent, water, and electricity in the camp. With this option, the poverty metrics including poverty incidence and poverty gaps were calculated for all refugee populations – camp, outof-camp and all refugees using one poverty line.

In practice, the CBN poverty line is computed in four steps. The first step is defining a reference population in terms of deciles whose food basket composition reflects the actual food consumption patterns of "poor" people. In this exercise, the 2nd to 6th deciles of per capita food consumption was adopted as the reference population. This is because it is known that the poverty rate for non-Jordanians, including refugees, is 40 % from the 2018 HIES.

The second step is the selection of food items to include in the food basket. Since the long consumption module contains more food items than the short, the CBN poverty line was calculated from the respondents that completed the long consumption module. The long

form also has some composite items and prepared meals, which can be very heterogenous and difficult to construct meaningful prices and calorie values. These composite items were dropped. The share of the composite items (food away from home) in the total food consumption is 2.5% outside the camp and 1.8% in the camp. Food items that accounted for 90% of the total food expenditure of the reference population was selected. The food poverty line is constructed on a per capita basis, and the household food consumption is translated into calories using the same food consumption table used in the HIES.

Third, once the food items are selected, the cost per calorie consumed was calculated. There are two ways of calculating the cost per calorie. The first method is the plutocratic method. This method involves calculating the (weighted) total calories consumed by the reference population and the total (weighted) value of food consumed from the selected items. The second method – the democratic method - entails first computing the cost per calorie using only the selected items for each household in the reference population and then calculating the (weighted) average. The weighted average becomes the average calories consumed by the household per capita. The democratic approach was selected because the plutocratic tends to weigh wealthier households more. The final weighted average calorie calculated was less than the recommended daily calorie requirement. This average was then scaled up to the target number of calories (2300 calories per capita per day). The summary of the food basket is shown in Table 3a, b and c of the annex.

The fourth step is to add the non-food component to the food poverty line. In line with the explanation provided earlier, the non-food component of the camp and out-of-camp populations are not comparable; hence, the non-food component of the two populations was estimated separately, although using the same procedure. The non-food component was calculated using the Ravallion method (Ravallion, 2012). It is based on the value of non-food consumption for households whose food consumption is close to the food poverty line. These are households whose food consumption is between 1 and 10 percent lower or higher than the food poverty line. For each percent 1 to 10 above or below the food poverty line, the mean non-food consumption per capita for the households was calculated as well as the average of the 10. The non-food component is added to the food poverty line to arrive at the final (absolute) poverty line.

Table 7 shows the poverty lines calculated from the two options, based on consumption aggregate before valuation of in-kind assistance in camp. In option 1 (separate food and separate nonfood), the food poverty line in camp is 15 JOD and 17 JOD in out-of-camp, while the absolute poverty line is 46 JOD in camp and 81 JOD in out-of-camp. In option 2 (Joint food and separate non-food), the food poverty line is 17 JOD per capita per day both in camp and out-of-camp, while the absolute poverty line is 82 JOD for the out-of-camp and 48 JOD for the camp population. There is therefore a minor difference in the

food poverty lines in camp and out-of-camp in option 1. This minor difference can be explained by the slightly lower per-calorie cost of food in the camp.

Table 7 also shows the poverty rates according to the different poverty line calculation options. At the CBN poverty line, the headcount poverty rate⁷ of refugees living outside the camp is 60% using option 1 or 61% using option 2. About 45% of out-of-camp refugees are food poor in both option 1 and option 2. The headcount poverty rate of refugees living in the camp is 23% in option 1, and 25% in option 2. The food poverty rate is 11% in option 1 and 16% in option 2. The two options show consistent results, however option 1 provides an opportunity to compare the food poverty levels of camp and out-of-camp refugees. The main conclusion that could be drawn from the two options is that the food poverty rate is higher outside the camp than in camp.

	Based on consumption aggregate before valuation of in-kind assistance in camp							
	Option 1: Separate fo separate absolute pov	od poverty and verty lines	Option 2: Joint food poverty and separate absolute poverty lines					
	Camp Camp		Camp	Out-Of-Camp				
Food Poverty Line14.916.7		16.7	16.7	16.7				
Food Poor 11% 45%		45%	16%	45%				
Absolute Poverty Line	46.4	81.1	48.3	81.5				
Headcount poverty	23%	60%	25%	61%				

Table 7: Poverty lines and poverty rates

Given that neither of the two options above could be used to calculate a comparable absolute poverty rate for the two groups, two additional simulation analyses were conducted to arrive at one poverty line. In simulation 1, the values of rent, water, and electricity were subtracted from the consumption aggregate of the out-of-camp population in order to calculate a new suboptimal but comparable absolute poverty line for both groups. In simulation 2, the values of rent, water, and electricity in the camp were estimated and added to the camp consumption aggregate. A detailed explanation of how this was done is presented in section 3.5.

The poverty rates from the estimated consumption per capita were calculated using two options. The option 2 is the same as above, where the food component of the poverty line is calculated jointly for the camp and the out-of-camp populations, and the non-food

⁷ Headcount poverty is the percentage of the population living under the poverty line and classified as poor.

allowance is calculated separately. However, in option 3, the food and non-food components of the poverty line are assessed jointly. The result show that the estimated absolute poverty line after subtracting cost of water, electricity and rent for out of camp refugees (simulation 1) is almost the same for both populations (~49 JOD) irrespective of the option adopted. Using this line, poverty rate in camp is 25% and poverty rate outside the camp is 55%.

In simulation 2, based on complete consumption aggregate, the poverty line of camp and out of camp refugee is 72 JOD and 82 JOD respectively using option 2. The poverty rate of out-of-camp refugees is 61% and that of camp refugee is 30%. However, in option 3 which uses one poverty line (81 JOD), the poverty rate outside the camp is 60% and inside the camp 45%. In addition, using this line, the national poverty rate of the refugees after valuing the in-kind assistance provided in camp is 57%. Generally, the sensitivity analyses conclude that poverty rate is consistently higher outside the camp than inside the camp. This result holds whether calculating the poverty rate using the baseline consumption aggregate or simulated consumption aggregate.

		Option 2: Joint food poverty and separate absolute poverty lines		Option 3: Joint food poverty and Joint absolute poverty lines		y and Joint
		Camp	Out-Of-Camp	Camp	Out-Of-Camp	All refugees
Simulation 1 (minus rent water and	Estimated absolute poverty line	48.3	48.8	48.7	48.7	
electricity in out-of- camp)	Estimated headcount poverty	25%	55%	25%	55%	
Simulation 2 (plus rent water and	Estimated absolute poverty line	71.5	81.5	80.7	80.7	80.7
electricity in camp)	Estimated headcount poverty	30%	61%	45%	60%	57%

Table 8: Sensitivity analyses result

4.2 INTERNATIONAL POVERTY LINES AND RATES

The international poverty line provides a quick and easy way of determining the share of the poor population. While the CBN is based on consumption patterns observed among Jordanian refugees, the international poverty line is not specific to Jordan. The International Poverty Line is set by the World Bank to be representative of national definitions of poverty adopted in each income group or economy, e.g., low-income countries, lower-middle-income countries, and upper-middle-income countries. The poverty lines include \$5.5 per person per day PPP (purchasing party parity) which is the international poverty line for upper-middle-income countries to which Jordan belongs. The international poverty line at \$5.5 was estimated to be 90 JOD per person per month. Additionally, the \$3.2 international poverty line of lower-middle-income countries was estimated to be 53 JOD per person per month.

The international poverty rates were calculated using the consumption aggregate those accounts for the value of in-kind items provided in camp. At the \$5.5 international poverty line, the headcount poverty rate of all refugees is 66%, the share of poor refugees living outside the camp is 68%, and the share living inside the camp is 59%. At \$3.2, the headcount poverty rate of all refugees is 21%, the share of poor refugees living outside the camp is 24%, while that of camp refugees is 7%. The result therefore show consistency between the local poverty line (81JOD) and the international poverty line at \$5.5.

4.3 EXTREME POVERTY AND POVERTY GAPS

Extreme poverty was measured in two ways. The first is the share of the population whose total consumption is below the food poverty line. The second way is the share of the population living on less than \$1.90 a day (equivalent to 31 JOD per person per month). These two values were estimated using the welfare metric that accounted for in-kind assistance in the camp. Based on the estimates from the survey, no refugee inside the camp is extremely poor while only 1% of those living outside the camp live on \$1.9 per person per day.

The poverty gap reflects the intensity of poverty, showing the average shortfall of the total population from the poverty line. A class of functional forms suggested by Foster, Greer and Thorbeke (FGT), uses various powers of the proportional gap between the observed and the required consumption expenditure as the weights to indicate the level of intensity of poverty. Using the FGT method, the poverty gap at 81 JOD is 16% for all refugees, 18% for out-of-camp refugees, and 9% for camp refugees. The poverty severity is 6% for all refugees, 7% for out-of-camp refugees and 3% for camp refugees. This exercise suggests that the incidence, depth, and severity of out-of-camp poverty is relatively higher as compared to camp. Table 9 shows the poverty rate across different locations.

		Food Poor	Headcount Poverty Rate	International Poverty Rate (\$5.5)	International Poverty Rate (\$3.2)	International Poverty Rate (\$1.9)
	Line	16.71 JOD	80.72 JOD	90.35 JOD	52.56 JOD	31.26 JOD
Residence	Camp	15.54%	44.57%	58.79%	7.15%	0.00%
	Out-Of-Camp	44.84%	59.88%	67.80%	24.06%	1.19%
Nationality	Non-Syrian	47.04%	49.86%	55.86%	21.63%	1.10%
	Syrian	44.42%	61.76%	70.04%	24.52%	1.21%
	Camp-Syrian	15.54%	44.57%	58.79%	7.15%	0.00%
Location	Ajloun	24.69%	71.19%	79.20%	35.65%	4.62%
	Albalqa	38.54%	57.89%	66.10%	25.09%	0.48%
	Alkarak	52.68%	64.69%	74.35%	25.83%	1.81%
	Amman	47.63%	52.94%	60.71%	18.00%	0.33%
	Aqaba	52.04%	51.88%	59.93%	15.85%	0.38%
	Irbid	35.55%	60.78%	69.40%	23.55%	0.50%
	Jerash	58.68%	77.46%	84.93%	51.12%	8.61%
	Maan	74.30%	72.73%	77.99%	42.08%	4.67%
	Madaba	38.81%	61.80%	72.05%	18.60%	0.96%
	Mafraq	50.56%	74.77%	82.07%	38.13%	3.91%
	Tafila	42.81%	68.94%	77.39%	36.66%	3.85%
	Zarqa	40.63%	64.78%	72.21%	27.38%	1.10%
	Azraq camp	13.92%	53.26%	63.57%	9.15%	0.00%
	Zaatari camp	16.39%	40.05%	56.31%	6.11%	0.00%
All	Sample	39.80%	57.25%	66.25%	21.15%	0.99%

Table 9: Poverty Rate Table

5 CONCLUSION AND LESSONS LEARNT

This paper described the method of computing the consumption aggregate and poverty measurement for refugees. It focuses on registered refugees in Jordan using the 2021 VAF Population Survey. The study is the first attempt to measure poverty using a standard consumption module for refugee populations in the MENA region. It shows that the headcount poverty rate for all registered refugees is 57%, the headcount poverty for refugees living outside camps is 60%, and for refugees living in camps is 45%. It shows also that the incidence, depth, and severity of poverty is higher for out-of-camp refugees compared to camp refugees after the valuation of assistance received in camps.

Some lessons can be drawn from this exercise. First, despite challenges, it is possible to collect information on consumption for the refugee population. The 2018 Jordan HEIS provided the basis for the consumption module, where items that account for 90 percent of the consumption of the poorest non-Jordanians were selected. A short and long survey

forms were tested, and a correction factor was applied to reduce the differences between the two survey instruments. Once these adjustments were made, there was no significant difference in poverty levels between households that completed long or short survey forms. Generally, the selection of items to include on short and long forms, as well as the method of weighting to adjust consumption for households interviewed with the short form, seem to be appropriate.

Secondly, in refugee settings where the majority of the population is poor, it can often be challenging to determine what constitutes a household since many refugee families tend to live together as a coping mechanism. In some cases, they may pool resources and act as one household unit, whereas others may operate independently. In situations where they operate as a separate unit, they do not meet the traditional definition of a household. Hence, the total number of individuals in the household may no longer be an accurate measure of per capita consumption. Our solution to this problem was to incorporate the sharing unit concept, which captures the number of people in a household who share meals and pool resources. In this way, UNHCR's case classification and the standard definition of a household can be reconciled using the sharing size.

Finally, the provided an appropriate method to measure a comparable poverty line in and out of camp. Since housing, water, and electricity are provided in kind, they are not included in the camp consumption aggregate. In order to arrive at a consistent poverty line, three options were tested. In option 1, the food poverty component of the CBN approach was assessed jointly for both refugees in camps and those who were living outside camps. In option 2, the food component was separately calculated, and in option 3 both food and nonfood component were calculated joint. Additional, option 3 require that the welfare metric is comparable, and as such, the values of rent, water, and electricity in the camp were estimated. Using the latter approach a realistic one poverty line for refugees living in camps and out of camps that is consistent with the international poverty line was estimated.

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ANNEX

Table	1:	Non-	food	module	and	recall	period
10010	 .	11011	1000	modulo	0110	100011	period

#	Category	Long Nonfood Item	Frequency
	Transport and		, inclusion,
NFL.01	communication	Gasoline for private cars (standard\ super)	Monthly
	Transport and		,
NFL.02	communication	Costs for taxi	Monthly
	Transport and		
NFL.03	communication	Costs for bus	Monthly
	Transport and		
NFL.04	communication	Cellular phone bill	Monthly
NFL.05	Personal care	Men's and boys' haircut fees	Monthly
NFL.06	Personal care	Women and girls' hair salon	Monthly
NFL.07	Personal care	Perfumes	Monthly
NFL.08	Personal care	Soap	Monthly
NFL.09	Personal care	Shampoo	Monthly
NFL.10	Personal care	Toothbrush	Monthly
NFL.11	Personal care	Toothpaste	Monthly
NFL.12	Personal care	Tissues all types	Monthly
NFL.13	Personal care	Kitchen towels	Monthly
NFL.14	Personal care	Diapers (for infants and adults, including feminine hygiene products)	Monthly
NFL.15	Personal care	Mouth mask (for coronavirus)	Monthly
NFL.16	Tobacco	Tobacco (cigarettes and shisha)	Monthly
NFL.17	Health	Medicines (Monthly or one-off prescriptions, etc.)	Monthly
NFL.18	Health	Medical glasses	Annual
		Hospital, clinic, and dental costs - excluding medicines purchased from a	
NFL.19	Health	pharmacy	Annual
NFL.20	Education	School fees (preschool to university)	Annual
NFL.21	Education	School bags	Annual
NFL.22	Education	School uniforms	Annual
NFL.23	Education	Stationery, e.g., books, pens, tablets/smartphones for remote learning, etc.	Annual
NFL.24	Clothing and footwear	Clothes (Men, women, and children – excluding school uniforms)	Bi-annual
NFL.25	Clothing and footwear	Shoes (Men, women, and children – excluding school uniforms)	Bi-annual
NFL.26	Clothing and footwear	Bags (excluding children's school bags)	Bi-annual
			Select (daily -
NFL.27	Cleaning materials	Detergent all types	annually)
			Select (daily -
NFL.28	Cleaning materials	Plastic bags\ plastic table cover rolls \ wrapping plastic rolls	annually)
	Housing, water,	Duch	Select (daily -
NFL.29	electricity, and gas	Kent	annually)
NEL 20	Housing, water,	Internat casts	Select (daily -
INFL.30	Housing water		Soloct (doily
NEL 21	oloctricity and gas	Gas sulinder (for cooking)	select (daily -
INFL.SI	Housing water	Gas cylinder (for cooking)	Select (daily -
NEL 32	electricity and gas	Gas refil	annually)
111 2.02	Housing water		Select (daily -
NFL33	electricity, and gas	Kerosene (Euel for heating)	annually)
111 2.00	Housing, water,		Select (daily -
NFL.34	electricity, and gas	Water bill	annually)
	Housing, water.		Select (daily -
NFL.35	electricity, and gas	Electricity bill	annually)
	Housing, water,	The cost of repairing, maintaining, and renovating of dwelling, is borne by the	Select (daily -
NFL.36	electricity, and gas	tenant	annually)

	Long-form	Short form
VARIABLES	log rent	log rent
Number of rooms	0.0709***	0.0584***
	(0.00623)	(0.00417)
Number of rooms2	-0.00820***	-0.00462***
	(0.00115)	(0.000744)
Type of shelter = Formal Sub-standard Building	-0.0206***	-0.0136***
	(0.00450)	(0.00319)
Type of shelter = Informal Settlement	-0.108***	-0.0434***
	(0.0108)	(0.00898)
Is there a kitchen and a bathroom? = Yes	0.00180	0.0309***
	(0.00730)	(0.00636)
Roof condition (leakage/structural) = Sub-standard	-0.00567***	-0.00483***
	(0.00207)	(0.00128)
Electrical installation condition = Substandard	-0.0101***	-0.00339
	(0.00363)	(0.00232)
Opening condition = Substandard	-0.00800***	-0.0133***
	(0.00298)	(0.00205)
Is c ase located in rural area = Yes	-0.0159***	-0.0190***
	(0.00369)	(0.00247)
Governorate = AlBalqa	0.0370***	0.0114
	(0.0115)	(0.00773)
Governorate = AlKarak	0.00729	0.00142
	(0.0126)	(0.00856)
Governorate = Amman	0.0420***	0.0375***
	(0.0104)	(0.00706)
Governorate = Aqaba	0.0478***	0.0270***
	(0.0141)	(0.00996)
Governorate = Irbid	0.0184*	0.0105
	(0.0105)	(0.00706)
Governorate = Jerash	0.00859	-0.00278
	(0.0133)	(0.00865)
Governorate = Maan	0.0180	-0.00438
	(0.0130)	(0.00869)
Governorate = Madaba	0.0178	0.0101
	(0.0126)	(0.00829)
Governorate = Mafraq	0.0159	0.00690
	(0.0105)	(0.00701)
Governorate = Tafila	0.00283	-0.0116
	(0.0185)	(0.0139)
Governorate = Zarqa	0.0104	-0.00455
	(0.0109)	(0.00735)
Constant	1.839***	1.828***
	(0.0148)	(0.0105)
Observations	2,076	5,697
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Table 2: Result of hedonic regression for rent (Out of Camp)

item	Share of	Daily	Daily calories	Median	price per	cost	Share of	Share of
	food	consumption	consume per	unit price	calorie		cost	calorie
		per capita	capita (adjusted)					
Apples	0.32	0.004	2.12	1.000	1.887	0.1215	0.727	0.092
Bananas	0.33	0.003	3.01	1.000	1.070	0.0979	0.586	0.131
Beans	1.34	0.010	28.05	0.001	0.000	0.0004	0.002	1.220
Biscuits	0.50	0.003	11.33	0.002	0.001	0.0002	0.001	0.493
Bread	16.53	0.363	944.09	0.400	0.154	4.4207	26.461	41.047
Cheese	0.74	0.003	9.33	3.000	0.854	0.2425	1.451	0.406
Chicken	5.17	0.027	34.57	2.000	1.572	1.6528	9.893	1.503
Chips	1.03	0.003	15.85	0.004	0.001	0.0004	0.002	0.689
Chocolate	0.12	0.009	46.42	0.200	0.040	0.0560	0.335	2.018
Cucumbers	2.68	0.055	9.46	0.500	2.924	0.8416	5.037	0.411
Dates	0.43	0.002	4.87	0.002	0.001	0.0001	0.001	0.212
Eggs	3.91	0.431	24.12	0.092	1.637	1.2012	7.190	1.049
Fish	0.69	0.001	1.90	0.625	0.328	0.0190	0.114	0.083
Frozen Fish	0.24	0.001	1.49	2.750	1.460	0.0659	0.395	0.065
Garlic	2.12	0.003	4.77	0.008	0.005	0.0008	0.005	0.208
Grapes	0.61	0.011	3.55	0.650	1.940	0.2094	1.254	0.154
Greens	0.82	0.011	3.06	1.400	5.192	0.4836	2.895	0.133
Hummus	0.19	0.002	3.11	1.000	0.692	0.0654	0.391	0.135
lce-cream	0.35	0.035	88.49	0.100	0.039	0.1051	0.629	3.847
Infant Milk	2.38	0.003	13.70	0.011	0.002	0.0009	0.005	0.596
Juice	0.47	0.008	3.64	0.800	1.667	0.1847	1.106	0.158
Labneh	1.86	0.006	3.48	0.004	0.006	0.0006	0.004	0.151
Lemons	0.70	0.007	2.57	1.000	2.857	0.2232	1.336	0.112
Macaroni	1.62	0.015	53.77	0.001	0.000	0.0005	0.003	2.338
Mandarins	0.06	0.001	0.73	0.700	1.333	0.0298	0.178	0.032
Margarine	0.78	0.002	15.05	0.004	0.000	0.0002	0.001	0.654
Meat	2.96	0.005	10.19	5.000	2.632	0.8156	4.882	0.443
Milk	0.08	0.001	0.58	0.900	1.299	0.0230	0.138	0.025
Nuts	0.03	0.000	0.60	4.000	0.708	0.0130	0.078	0.026
Oil	5.77	0.027	243.59	0.002	0.000	0.0016	0.010	10.591
Onions	2.05	0.044	17.29	0.500	1.276	0.6706	4.014	0.752
Oranges	0.15	0.002	1.15	0.625	1.330	0.0466	0.279	0.050
Other	1.77	0.003	10.45	0.007	0.002	0.0006	0.004	0.454
Spices								
Peaches	0.13	0.003	1.07	0.667	1.626	0.0528	0.316	0.046
Potatoes	3.24	0.069	45.11	0.500	0.762	1.0458	6.260	1.961
Powder	2.91	0.006	32.09	0.005	0.001	0.0010	0.006	1.395
Milk	7.00	0.070	252 (/	1.000		0.0445	40.007	10.005
Rice	7.28	0.073	252.66	1.000	0.288	2.2115	13.237	10.985
Salt Pepper	0.69	0.005	15.17	0.002	0.001	0.0002	0.001	0.660
Soda	0.15	0.003	1.16	0.600	1.395	0.0491	0.294	0.050
Sugar	4.30	0.066	262.15	0.001	0.000	0.0013	0.008	11.398
	0.24	0.001	3.49	0.004	0.001	0.0001	0.000	0.152
Tomatoes	4.12	0.139	30.06	0.350	1.620	1.4816	8.868	1.307
TomPuree	1.25	0.007	2.70	0.002	0.005	0.0004	0.002	0.117
Watermelon	0.74	0.028	9.24	0.313	0.944	0.2655	1.589	0.402
Yogurt	5.18	0.049	28.72	0.001	0.002	0.0019	0.011	1.249

Table 3a: Joint Food Basket – Option 1

item	Share	of	Daily	Daily	Median	Average	price	cost	Share of	Share of
	food		consumption	calories	unit	unit	per calorie		cost	calorie
			per cupitu	per capita	price	price	caloric			
				(adjusted)						
Apples	0.22		0.003	1.45	1.000	1.000	1.887	0.083	0.500	0.06
Bananas	0.23		0.002	2.24	1.000	1.020	1.070	0.073	0.437	0.10
Beans	1.41		0.011	30.28	0.001	0.001	0.001	0.000	0.003	1.32
Biscuits	0.45		0.003	10.45	0.002	0.002	0.001	0.000	0.001	0.45
Bread	16.71		0.366	950.17	0.400	0.504	0.154	4.449	26.701	41.31
Cheese	0.73		0.003	9.36	3.000	3.055	0.854	0.243	1.460	0.41
Chicken	4.91		0.026	32.84	2.000	1.956	1.572	1.570	9.423	1.43
Chips	1.02		0.003	14.48	0.004	0.005	0.001	0.000	0.002	0.63
Chocolate	0.13		0.010	48.25	0.250	0.245	0.050	0.073	0.437	2.10
Cucumbers	2.58		0.052	8.92	0.500	0.563	2.924	0.794	4.763	0.39
Dates	0.51		0.002	5.72	0.002	0.003	0.001	0.000	0.001	0.25
Eggs	3.87		0.434	24.31	0.092	0.096	1.637	1.210	7.264	1.06
Fish	0.76		0.001	2.08	0.667	0.611	0.350	0.022	0.133	0.09
Frozen Fish	0.31		0.001	1.84	2.750	2.959	1.460	0.082	0.491	0.08
Garlic	2.12		0.003	4.55	0.009	0.008	0.006	0.001	0.005	0.20
Grapes	0.64		0.012	3.87	0.650	0.685	1.940	0.229	1.371	0.17
Greens	0.71		0.010	2.56	1.400	1.319	5.192	0.405	2.429	0.11
Hummus	0.22		0.002	3.51	1.000	0.918	0.692	0.074	0.443	0.15
lce-cream	0.41		0.041	105.73	0.100	0.105	0.039	0.126	0.754	4.60
Infant Milk	2.76		0.003	15.66	0.011	0.009	0.002	0.001	0.006	0.68
Juice	0.30		0.006	2.67	0.850	0.834	1.771	0.144	0.862	0.12
Labneh	1.94		0.006	3.64	0.004	0.004	0.006	0.001	0.004	0.16
Lemons	0.63		0.007	2.37	1.000	1.014	2.857	0.206	1.234	0.10
Macaroni	1.70		0.016	58.49	0.001	0.001	0.000	0.000	0.003	2.54
Mandarins	0.00		0.000	0.00	0.700	0.699	1.333	0.000	0.001	0.00
Margarine	0.75		0.002	14.05	0.005	0.004	0.001	0.000	0.002	0.61
Meat	3.02		0.006	10.55	5.000	6.100	2.632	0.845	5.069	0.46
Milk	0.10		0.001	0.74	0.900	0.917	1.299	0.029	0.176	0.03
Nuts	0.02		0.000	0.42	4.000	3.888	0.708	0.009	0.055	0.02
Oil	5./1		0.025	226.53	0.002	0.004	0.000	0.002	0.009	9.85
Onions	2.11		0.045	17.68	0.500	0.527	1.276	0.686	4.117	0.77
Oranges	0.12		0.002	0.78	0.667	0.884	1.418	0.034	0.202	0.03
Other Spices	1.60		0.003	9.62	0.007	0.006	0.002	0.001	0.003	0.42
Peaches	0.14		0.003	1.18	0.667	0.676	1.626	0.058	0.350	0.05
Potatoes	3.31		0.068	44.80	0.500	0.545	0.762	1.039	0.234	1.95
Powder Milk	2./1		0.006	30.43	0.005	0.005	0.001	0.001	0.005	1.32
Rice	7.59		0.076	265.74	1.000	1.079	0.288	2.326	13.959	11.55
Salt Pepper	0.73		0.003	1 20	0.002	0.002	1.205	0.000	0.001	0.06
Sugar	4.07		0.003	2/1 7/	0.000	0.094	0.000	0.054	0.327	10.51
Jugai	4.07		0.000	241.74	0.001	0.001	0.000	0.001	0.007	0.14
Tomatoes	4 15		0.001	30.54	0.004	0.004	1 620	1 505	9.032	1 33
TomPuree	1.1.5		0.007	2.80	0.002	0.073	0.005	0.000	0.002	0.12
Watermelon	0.78		0.030	9.93	0.313	0.344	0.005	0.000	1 712	0.12
Yogurt	4.85		0.046	26.76	0.001	0.001	0.002	0.002	0.012	1.16

Table 3b: Separate Food Basket – Option 2 – Out of Camp

	Share of food	Daily consumption per capita	Daily calories consume per capita (adjusted)	Median unit price	Average unit price	price per calorie	cost	Share of cost	Share of calorie
Apples	0.96	0.012	6.37	0.750	0.856	1.415	0.274	1.842	0.277
Bananas	0.31	0.003	3.14	0.900	1.004	0.963	0.092	0.618	0.137
Beans	0.77	0.005	13.53	0.001	0.002	0.000	0.000	0.001	0.588
Biscuits	1.10	0.004	16.18	0.002	0.003	0.001	0.000	0.002	0.704
Bread	17.34	0.377	979.44	0.400	0.461	0.154	4.586	30.823	42.585
Cheese	0.68	0.001	4.43	5.000	5.196	1.424	0.192	1.289	0.192
Chicken	4.56	0.025	31.73	1.893	1.913	1.488	1.436	9.649	1.380
Chips	1.98	0.008	41.17	0.003	0.003	0.001	0.001	0.005	1.790
Cucumbers	2.66	0.057	9.69	0.500	0.504	2.924	0.862	5.794	0.421
Eggs	5.21	0.513	28.71	0.093	0.100	1.667	1.456	9.783	1.248
Fish	0.73	0.001	2.37	0.500	0.557	0.262	0.019	0.127	0.103
Garlic	1.57	0.004	6.81	0.004	0.005	0.003	0.001	0.004	0.296
Greens	0.92	0.018	4.85	0.750	0.865	2.781	0.410	2.758	0.211
Infant Milk	0.79	0.001	4.01	0.012	0.010	0.002	0.000	0.002	0.175
Juice	0.76	0.009	4.49	0.800	0.747	1.667	0.228	1.529	0.195
Labneh	2.50	0.007	4.41	0.003	0.004	0.005	0.001	0.004	0.192
Lemons	1.00	0.012	4.11	0.785	0.931	2.243	0.280	1.883	0.179
Macaroni	0.63	0.007	24.99	0.001	0.001	0.000	0.000	0.001	1.087
Mandarins	0.51	0.013	6.93	0.500	0.493	0.952	0.201	1.349	0.301
Margarine	1.33	0.004	27.17	0.004	0.004	0.000	0.000	0.003	1.181
Meat	1.28	0.002	3.56	7.000	6.826	3.685	0.399	2.684	0.155
Nuts	0.14	0.000	2.77	2.000	2.427	0.354	0.030	0.201	0.121
Oil	6.32	0.037	331.28	0.002	0.002	0.000	0.002	0.011	14.403
Onions	2.13	0.040	15.71	0.500	0.531	1.276	0.610	4.098	0.683
Oranges	0.42	0.009	4.13	0.500	0.583	1.064	0.134	0.898	0.180
Other Spices	2.53	0.004	14.76	0.005	0.007	0.001	0.001	0.004	0.642
Potatoes	3.57	0.077	50.35	0.500	0.556	0.762	1.167	7.844	2.189
Powder Milk	3.34	0.007	33.61	0.005	0.005	0.001	0.001	0.007	1.461
Rice	5.13	0.048	167.30	1.000	1.080	0.288	1.464	9.842	7.274
Salt Pepper	0.59	0.006	18.21	0.001	0.001	0.000	0.000	0.001	0.792
Sugar	5.16	0.088	352.62	0.001	0.001	0.000	0.001	0.009	15.331
Tahini	0.53	0.001	5.49	0.004	0.005	0.001	0.000	0.001	0.239
Tomatoes	4.00	0.135	29.23	0.250	0.353	1.157	1.029	6.915	1.271
TomPuree	0.94	0.005	1.98	0.002	0.002	0.005	0.000	0.002	0.086
Yogurt	7.56	0.076	44.45	0.001	0.001	0.002	0.002	0.015	1.932

Table 3c: Separate Food Basket – Option 2 – Camp

Table 4: Comparison the consumption surveys with best practices

Best practices	VAF 2021/2022
Mancini and Vecchi (2022)	
Food consumption component	
Food components The aggregate should include not just (i) food purchased in the marketplace, including meals purchased away from home for consumption at or away from home, but also (ii) food that is home- produced, (iii) food items received as gifts or remittances from other households, as well as (iv) food received from employers as payment-in- kind for services rendered.	The aggregate includes all food consumed from all sources including food purchased in the marketplace, meals consumed away from home as well as food items received as gifts.
Recall period Estimates of food purchases obtained via simple recall (one week to a month) are preferred to "usual month" estimates. Include food purchased from the market as the amount spent in the typical period Ï Y (where Y is the number of days, weeks or months typically consumed).	Estimates of food purchases obtained via one week recall period.
Food away from home Include the value of food consumed outside the home as the total of: amount spent in restaurants, amount spent on prepared foods, amount spent on meals at work, amount spent on meals at school, amount spent on meals on vacation.	Include the value of food consumed outside the home at the household level. The questionnaire was detailed in the long form but not detailed in the short form
Home produced food Food that is home-produced: quantity in typical period x farmgate price x number of months typically consumed.	Home produced foods are not part of the model since refugees rarely farm owners.
In-kind food Food received as gift or in-kind payment: total value for a year.	The survey includes food received as a gift or in-kind.
Missing prices or unit values First choice is price (unit value) reported by the household; if not available, use as a proxy the median – not mean – price paid by 'similar' households in the neighborhood, subject to checks that such prices are plausible. Check data for outliers; miscoding or misunderstanding of units for quantities causes errors in unit values.	For unit values, the first choice is unit price reported by the household; if not available the median unit value reported by households in the governorate or camp is used. Outliers are checked and corrected.
Food rations "Official" value cannot be included in the consumption aggregate: rations must be re-priced using an estimated market price, one that adequately represents the marginal utility of the ration for the consumer.	N/A. The survey did not collect the information
NON-FOOD COMPONENT	
Daily use items	Done
Annualize the value.	
Clothing and housewares	
Annualize the value.	Done
Exclusions Exclude taxes paid, purchase of assets, repayment of loans, expenditure on durable goods and housing, as well as other lumpy expenditures such as marriages and dowries. To the extent that local property taxes bear a relation to services rendered, we recommend their inclusion.	Done
Repricing subsidized goods	
Expenditures on utilities, water, gas, electricity, or telephone can be problematic if some households are subsidized and some are not. () In some cases, making accurate regional (and certainly international) welfare comparisons will make it necessary to make corrections to (by repricing) the reported expenditures.	The repricing was not done
Regrettable necessities Include expenditure on items that may or may not be regrettable necessities	N/A. The information was not collected by the survey
Exclusion of work-related expenditures To the extent possible, purely work-related expenditures should be excluded. This recommendation does not include transport to work or work clothing.	The survey doesn't collect information related to purely work-related expenditures

Health expenditures Health expenditures should be included in the aggregate. Exclusion of selected health expenditures is still justified when they are atypical and "lumpy", but this need not be the case.	The aggregate captures the overall amount of health expenditures including medicines and hospitalization
Education expenses Typically measured quite accurately in most surveys - our recommendation is to include them.	The aggregate captures education expenses (tuition fees, books uniforms)
Exclusion of time and leisure Omit time and leisure in the calculation of consumption.	No attempt is made to value leisure time.
Public goods Do not include any valuation of public goods in the calculation of the household consumption aggregate.	No valuation of public goods included.
Durable - User-cost method and depreciation	
Estimate the consumption flow of consumer durables based on the user-cost method and estimate the depreciation parameter using the geometric model. If the information required by the geometric model is not available, use the economic life depreciation model. If all else fails, consider excluding durable goods from the aggregate.	User cost assuming straight line depreciation model
Rents	
Include both actual rent and a measure of imputed rent for owners and non-market tenants. Self-reported imputed rents may be used, if deemed accurate; hedonic regression models offer a viable alternative (Duan's retransformation should be used for predicted values from log- linear models); the user-cost and rent-to-value approaches may be useful if the first two methods fail. If no reliable estimate of rental expenditures can be produced, consider excluding rent (both actual and imputed) from the aggregate.	The aggregate includes actual rent and imputed rent estimated using a hedonic model.
Price indices Use price indexes to adjust nominal consumption. Use within-survey prices supplemented by prices from the price questionnaire, if available. The Paasche index is our preferred price index to use to adjust for cost- of-living differences faced by different households.	Paasche index was used
Household size Adjust household expenditure to reflect household size.	International poverty rate is calculated using per capita consumption. Sharing group unit was used.
Item non-response Irrespectively of whether item non-response was random or non- random, the recommendation is to report how any corrections were handled	Households with non-response on food consumption were removed and reweighted
Outlier detection and treatment	
 (i) Conduct sensitivity analysis, <i>e.g.</i>, by comparing results obtained for key indicators with and without the inclusion of outliers. (ii) Document how any outlier corrections were handled, to ensure the replicability of the final aggregate and allow comparisons with the 	Outlier were treated during computation Outliers >= (mean) + $2x 99^{th}$ percentile or (mean) - $\frac{1}{2} x1^{st}$ percentile
original data. (iii) When estimating trends, implement the same outlier detection and treatment routines across surveys, if possible.	The outlier is replaced by (median of the governorate level)

Format adapted from Comparability Survey study in Niger.