

EAST AFRICAN COMMUNITY



**EAC GUIDELINES ON MONETARY
POVERTY MEASUREMENT**

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FOREWORD

The East African Community (EAC) is a regional inter-governmental organisation comprising of seven (7) Partner States, namely: the Republic of Burundi, the Democratic Republic of the Congo, the Republics of Kenya, Rwanda, South Sudan, Uganda and the United Republic of Tanzania with its headquarters in Arusha, Tanzania. The EAC's objective is to widen and deepen co-operation among the Partner States in, among other fields, political, economic, cultural and social fields for their mutual benefit.

To this extent, the EAC is pursuing four stages of integration to achieve its objectives: a) Customs Union - this involves the strengthening of the free trade area where Partner States adopt a common trade policy with common external tariffs; b) Common Market – this entails the free movement of people, labour, goods, services and capital across national borders; c) Monetary Union – the aim of the monetary union is to ease trade by introducing a single currency to be used across the entire region, and; d) Political Federation this is the ultimate stage of the integration. In 2017, the Summit of EAC Heads of State adopted a Political Confederation as a transitional model to the Political Federation.

Regional integration however, is not an end in itself, but rather a tool that enables Partner States to address their development challenges, including achieving sustainable growth and poverty reduction. This aligns with Article 5 of the EAC Treaty which emphasises developing policies and programmes to widen and deepen co-operation among the Partner States for sustainable development, with the aim of achieving high and shared growth that can effectively reduce poverty and raise the living standards of East Africans.

To measure and monitor progress in poverty reduction and inclusivity of national development, Partner States conduct surveys to produce poverty estimates. These estimates are based on international standards and definitions, which are adapted and translated to the specific national contexts of each country. Nevertheless, there exists a significant divergence in the approaches and measurements adopted by different countries to align with their unique requirements and contexts. This discrepancy consequently undermines the ability to make meaningful comparisons regarding the impact of EAC integration on poverty levels and living standards within the EAC population.

To address this, the EAC Secretariat through the Regional Technical Working Group on poverty statistics has developed Guidelines designed to harmonise the measurement and analysis of poverty by using a consistent methodology, a set of common tools, and estimation practices. Development of the Guidelines took into consideration international best practices, empirical evidence, and current practices from the EAC Partner States. I thank all the contributors for their commitment and dedication to the process of developing the Guidelines.

Hon. (Dr.) Peter M. Mathuki
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ACRONYMS

CAPI	Computer Assisted Personal Interview
CBN	Cost of Basic Needs Approach
COICOP	Classification of Individual Consumption According to Purpose
COLI	Cost of Living Index
CPI	Consumer Price Index
EAC	East African Community
FAO	Food and Agriculture Organisation
FPL	Food Poverty Line
HBS	Household Budget Surveys
ISTEEBU	Institut de Statistiques et d'Etudes Economiques du Burundi
KNBS	Kenya National Bureau of Statistics
LSMS	Living Standards Measurement Survey
MPI	Multidimensional Poverty Index
NISR	National Institute of Statistics of Rwanda
NMPI	National Multidimensional Poverty Index
NSOs	National Statistical Offices
NSUs	Non-standard units
NSS	National Statistical System
PAPI	Paper Assisted Personal Interview
PPP	Purchasing Power Parity
PS	Partner State
SDGs	Sustainable Development Goals
UBOS	Uganda Bureau of Statistics
UNHS	Uganda National Household Survey
URT	United Republic of Tanzania
WHO	World Health Organisation

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1. INTRODUCTION

1.1 Background on poverty measurement in the East African Community (EAC)

1. Improving living standards is a core principle of the East African Community (EAC) integration process as expounded in Article 5 of the EAC treaty which, among others, identifies “strengthening and consolidation of co-operation in agreed fields that would lead to equitable economic development within the Partner States (PS) and which would in turn, raise the standard of living and improve the quality of life of their populations” as a primary objective. To monitor the impact of the regional integration process on living standards at the regional level, the EAC needs to collect and compare poverty statistics on a consistent basis. Poverty may be defined as pronounced deprivation in well-being (World Bank, 2000).
2. To measure and monitor progress in poverty reduction, most National Statistical Offices (NSOs) in the EAC¹ have traditionally conducted household surveys. These surveys have been a longstanding practice, generating poverty estimates, based on international standards and definitions adapted to their national contexts. However, the diverse approaches and methodologies adopted by individual countries to fit with their specific needs and contexts exhibit notable disparities in procedures and underlying assumptions. These disparities make it challenging to attain a comprehensive regional perspective on poverty estimations and trends. Consequently, there is a need for the establishment of minimum standards for the region and build national capacities to implement the standards.

1.2 Harmonisation and why it is important.

3. **Current poverty statistics are not directly comparable:** The EAC secretariat undertook a situational analysis in 2020/21 to understand how poverty is measured across EAC Partner States. Broadly, the findings show a consensus about the guiding principles underlying poverty measurement. They also reveal, however, considerable variation in how these principles is implemented and interpreted in practice. One unintended consequence of the various methods of survey data collection and poverty estimation is the difficulty of comparing poverty measures across countries and across time. The lack of uniformity also makes it difficult to confidently integrate country-level poverty measures to gain an overall sense of regional poverty. Subsequently, a direct comparison of the current poverty rates from Partner States (Annex 1a and 1b) is not possible since differences in poverty indicators/statistics could be due to both factual conditions and/ or methodological differences.
4. **Need to assess the effect of integration on welfare:** As cooperation within the EAC widens and integration deepens, so does the need to have harmonised indicators on poverty in order to assess and monitor its effect on welfare of the people. More so, comparable poverty statistics will facilitate evidence-based decision-making with regard

¹ At the production of these guidelines, EAC was composed of 6 Partner States (Burundi, Kenya, Rwanda, South Sudan, Tanzania and Uganda)

to the implementation of sectoral policies across the Community². It is therefore imperative that poverty measurements within the Community are designed to yield the greatest possible degree of comparability in terms of both concepts and procedural aspects, hence, the need for these guidelines.

5. **Key issues for harmonisation:** While the current differences in poverty measurement methodologies may partly reflect differences in national conditions and policy needs, there are substantial areas where greater uniformity will raise the overall quality of poverty measures and improve comparability of measures across time and location. Several steps to consider in achieving greater comparability and transparency include decisions to:
 - i. Base poverty measurement on expenditure data rather than income
 - ii. data; inclusion and exclusion criteria for the consumption aggregate.
 - iii. Create shared guidelines for household survey methods used to collect data on important consumption items.
 - iv. Select a standard set of adjustments for household composition and differences in cost of living; and
 - v. Establish standards for how poverty lines are set, including how to
 - vi. determine both food and non-food portions of poverty lines (where the cost of basic needs approach is taken).

6. **The harmonisation process faces certain trade-offs:** On one hand, ensuring regional comparability implies the use of universal definitions and harmonised methodologies; but on the other hand, a certain degree of flexibility is needed for the poverty measures to be comparable at the Partner State level before and after harmonisation. To avoid breaks in data series, allow for a trend analysis and comparison with previously estimated poverty statistics at partner state level, it is proposed that:
 - i. Partner States maintain complementary modules of interest in their data collection tools to allow for comparison with previous surveys.
 - ii. Any changes in the recall period or method of data collection (diary versus recall) should be accompanied by an experimental component aimed at assessing the impact of the changes on survey estimates.

1.3 Purpose of guidelines and the process of development

7. **Ensuring adherence to best practices and production of comparable poverty statistics:** At the regional level, there is little in the way of guidelines or structured systems in place to compile and harmonise poverty statistics. While we acknowledge that it is not easy to obtain statistics for different countries that can be put side by side, and the procedures for doing so are not obvious, we believe these guidelines are a good starting point. Accordingly, the guidelines are designed to yield the greatest possible degree of comparability in terms of both concepts and procedural aspects at the regional level. The notion of statistical comparability is interlinked with the impact that differences in statistical concepts, measuring instruments and procedures can have on the results obtained for different geographical areas or points in time.

² Community, Region and EAC are used interchangeably within these guidelines

8. The guidelines were developed through a participatory process that involved members of the Regional Technical Working Group on Poverty Statistics (drawn from National Statistical Offices (NSOs) and other poverty analysts from NSOs. The guidelines were also externally peer-reviewed by experts in welfare measurement. The recommendations were informed by existing literature on international best practices, empirical evidence, and current practices from the EAC Partner States.

1.4 Scope and audience

9. Focus of guidelines is mainly monetary poverty. The guidelines do not seek to explore different ways of conceptualising poverty or the possibility of introducing alternative methods. They mainly focus on improving and harmonising what is already being done across the Partner States. For example, while there are other ways in which monetary poverty may be measured, these guidelines focus on consumption expenditure as a welfare measure given its widespread usage among the Partner States and its advantages over income in a developing country context, as spelt out in literature (Deaton and Zaidi, 2002; Haughton and Khandker, 2009).
10. **Excludes guidance on multidimensional poverty measurement.** Of recent, the multidimensionality of poverty has been broadly recognised. For example, the Sustainable Development Goals (SDGs) focus on reducing poverty “in all its forms and dimensions” and some national and regional policies already address non-monetary deprivations in areas such as housing, health, education, and other services. We acknowledge that monetary poverty should be examined alongside deprivations in other relevant dimensions. Consequently, separate guidelines on how to comparably measure non-monetary poverty within the EAC region are needed.
11. **Audience:** The guidelines are intended for statisticians at NSOs whose immediate task is to collect survey data to construct consumption aggregates, set poverty lines and estimate official poverty statistics.

1.5 Outline of the guidelines

12. The guidelines are organised as follows.
 - i. **Chapter 2** makes recommendations on data sources, survey design, questionnaires (consumption module) and data collection.
 - ii. **Chapter 3** provides guidance on the construction of the nominal consumption aggregate.
 - iii. **Chapter 4** looks at adjustments to the nominal consumption aggregate. Chapter 5 addresses issues of setting poverty lines (food and non-food).
 - iv. **Chapter 6** discusses computation of key poverty indicators.
 - v. **Chapter 7** provides a discussion on documentation, metadata, and best practices in dissemination, and
 - vi. **Chapter 8** is a summary of all key recommendations provided within the entire document.

2. DATA COLLECTION AND QUESTIONNAIRE DESIGN

2.1 Data sources, frequency of surveys, population coverage and representativeness

13. **Source of data:** Most of what is known about poverty and living standards in Partner States comes from household surveys implemented by NSOs³ (Table 1). These surveys are mainly cross-sectional multi-purpose household surveys, with the characteristic that they always collect detailed information on household consumption (including consumption from own production), amount paid for the items purchased, and quantities purchased. This makes it possible to use a single source of information to estimate the value of both the poverty line and household consumption aggregate. However, given the technical and material resources required, such surveys aren't always frequently carried out.

Table 1: Household surveys for poverty measurement (coverage & frequency)

Country	Name of survey	Coverage	Latest survey as of 2022	Frequency (years)
Burundi	Household Survey of Living Conditions	Households; National, rural/urban, provinces	2019/20	5-6 years
Kenya	Kenya Integrated Household Budget Survey	Households; National, rural/urban, county	2015/16	10 ⁴
Rwanda	Integrated Household Living conditions survey	Households; National, rural/urban, province, district	2016/17	3
South Sudan	National Baseline Household Survey	Households; National, rural/urban, state	2009 2015 (high frequency survey)	No clear survey program in place
United Republic of Tanzania	Tanzania Mainland Household Budget Survey (HBS)	Households; National, rural/urban, region	2017/18	5
	Zanzibar Household Budget Survey (ZHBS)	Households; National, rural/urban, region, district	2019/20	5
Uganda	Uganda National Household Survey (UNHS)	Households; National, rural/urban, sub-region	2019/20	3

Source: Various NSO reports and scoping missions

Recommendation 1: Given their representativeness and objectivity, it is recommended that NSOs continue using household surveys as the major source of data for estimating official poverty statistics.

³ For purposes of these guidelines, we shall broadly refer to these surveys that go by different labels in Partner States (e.g., Household Budget Survey, Integrated Household Living Conditions Survey, National Household Survey as household surveys for poverty measurement).

⁴ Kenya has introduced smaller (in terms of modules) continuous household surveys that are aimed at providing annual poverty estimates

Uganda, United Republic of Tanzania, and Rwanda⁵ are conducting both cross-sectional household budget surveys (HBS) and Panel Surveys/Living Standards Measurement Survey (LSMS); the latter are used to analyse poverty dynamics in years between the HBS surveys.

- 14. Population coverage:** Poverty statistics should cover the entire population or sub-population of interest. However, as with all social statistics, the practical limitations of data collection mean this is not always straightforward or even possible. Consequently, standard household surveys cover only private households and tend to exclude people in communal settlements, homeless persons, refugees and other hard to reach categories even though poverty may be more prevalent in these particular demographic categories.

Recommendation 2: All poverty statistics within the EAC countries are computed based on private households. For comparability at regional level, it is recommended that NSOs continue covering private households.

Where deemed necessary (at Partner State level), targeted surveys to better understand poverty amongst groups that are typically absent from the sampling frameworks of standard surveys may be considered.

- 15. Domain of inference and representativeness:** Domains of inference are the levels at which the survey data will be represented, analysed, and reported, such as national, regional (or other administrative units), urban and rural, agro-ecological zones, and so on. Increasing the number of domains may seem appealing from an analytical or political perspective, but it would also increase the sample size, thus likely increasing non-sampling errors as well (Oseni et al., 2021). In all the Partner States, the survey designs in use facilitate production of poverty estimates that are at least representative at national; urban and rural areas; and the first administrative level (county, region, state etc.). Since most surveys use stratified random sampling, it is recommended that sampling weights are applied in the subsequent analysis to extrapolate from the sample data to the underlying population.

The sample design (in almost all countries) does not allow for representative lower levels of poverty estimates; NSOs should use other approaches such as small area estimation methodologies to estimate poverty at lower administrative units (refer to Box 1). This kind of disaggregation paves way for more precisely targeted policies.

⁵ Mainland Tanzania and Zanzibar have been conducting independent HBS surveys. Plans to have one integrated survey in 2023 are underway.

Recommendation 3: Countries should implement survey designs whose resulting estimates are representative **at least** at rural/urban and the first administrative level in each country.

Where possible, sampling designs should allow for estimates at lower administrative levels. Similarly, NSOs may use other approaches such as small area estimation methodologies to estimate poverty at lower administrative units.

Box 1: The use of survey and census data to estimate poverty at lower administrative levels.

Measuring poverty in small geographic areas has become a priority for many national and local governments. Household surveys are usually representative only for large sub-national contexts and thus cannot be used to estimate poverty at these levels. Several researchers have proposed a way to overcome this limitation by combining household survey information with population censuses, which are usually a limited source of information on household resources but allow very detailed disaggregation of data.

The method entails estimating income or expenditure in the survey using a set of explanatory variables that is also available in the census. The equation with the estimated parameters is then applied to census data to obtain the predicted value of expenditure or income for any sub-group of the population (for a detailed description of the methodology, see Hentschel and others, 1998, and Elbers, Lanjouw and Lanjouw, 2003).

16. Periodicity and frequency of surveys: There is large variation regarding the frequency and periodicity of surveys used for poverty measurement in the region. Apart from Rwanda and Uganda that conduct surveys every three (3) years, the frequency in other Partner States ranges from five (5) to ten (10) years. In some countries, there is no clear survey program and surveys are undertaken on an ad-hoc basis (Table 1). To increase the availability of poverty statistics for monitoring poverty across the region and narrow the existing gaps in the frequency of conducting surveys for poverty measurement among Partner States, it is proposed that surveys for poverty measurement are conducted at least every five (5) years, preferably every three (3) years. While it may be argued that poverty and inequality change relatively slowly over time, we believe a three-year interval is long enough to pick up changes that are statistically significant. Similarly, the 2015 World Bank Implementation Strategy for Household Surveys 2016-2030 recommends a frequency of three (3) years between surveys as this is considered to be adequate for poverty analysis and will also improve the prediction of estimates between surveys (World Bank, 2015).

Recommendation 4: Surveys used for poverty measurement should be conducted frequently so that countries can act based on relevant and timely information. To increase the frequency of poverty statistics and narrow the gap among Partner States, it is proposed that national household surveys for poverty measurement are conducted at least every five (5) years.

Partner States should schedule their national household surveys for poverty measurement within their national statistical development strategies, which should detail the sequencing of all planned surveys.

- 17. Timing and schedule of surveys:** In order to have statistics that are comparable in terms of time, we propose that the schedule for conducting household poverty surveys is harmonised as much as possible so that all Partner States are able to conduct surveys at around the same time. Furthermore, the timing of the surveys should take into account other surveys planned within the country's National Statistical System (NSS), in addition to the population census, which is a priority and must be conducted every ten (10) years (in part because of its critical importance as a sample frame for any nationally representative surveys).
- 18. Unit of observation:** In producing data on consumption, the normal unit of observation is normally the household, for both practical and conceptual reasons. A household is usually defined as a person or group of persons eating and living together. For data collected through household surveys, it is often impractical and expensive to collect detailed data from all members of the household. Similarly, it is challenging to allocate expenditures that are carried out on behalf of the whole household to its individual members, hence the proposal to maintain the household as the unit of observation for most of the modules, except for a few such as food consumption away from home.
- 19. Unit of analysis:** Although consumption is normally measured at the household level, this does not change the fact that poverty is experienced by individuals. Hence, policies and interventions should seek to improve the welfare of individual citizens, regardless of their status within the household. Poverty statistics should be reported at the individual level, with the indicators describing, for example, the number of individuals in a population living in households below the poverty line. Since the household is the unit of observation, the calculations are still fundamentally household based, a person is considered poor if he/she is a member of a poor household.

Recommendation 5: The unit of observation for consumption expenditure should typically be the household, while the unit of analysis of poverty should ideally be the individual.

2.2 Data collection

- 20. Improving comparability of survey questions:** Although household surveys (from which poverty indicators are calculated) are used for a number of purposes in different countries, standardisation is both possible and important especially for some modules and questions that are useful in welfare measurement. To achieve this, a model EAC Household Consumption and Expenditure Survey (HCES) questionnaire with modules covering household rosters, education, health, consumption (food, non-food non-durables, durables), labour, housing and utilities (water and energy) has been developed

to guide the harmonisation of data collection. The focus is largely on household consumption given its sensitivity to differences in methods and techniques on the resultant estimates. Partner States are implored to test and implement the standardised EAC HCES survey questionnaire.

- 21. Timing of visits and accounting for seasonality:** Fluctuations in consumption and expenditure within the year are common. Variation between months (seasonality) may be attributed to agricultural seasons, food production cycles, festivals and holidays, among others. There is also cyclical variation within months and weeks (payday for wage workers, market day, transfer-day' for households receiving cash transfers, Friday, Saturday, and Sunday, depending on culture) where consumption may differ from the usual. Seasonality and higher-frequency fluctuations usually involve quantities of food acquired and consumed; dietary patterns; and food prices.

Since the survey objective is usually to mirror typical consumption throughout the year, if variables of interest fluctuate during the year, the timing of the interview is not neutral. A survey carried out at one single time in the year may:

- i. Be unrepresentative of typical consumption across the year
- ii. Not be comparable regionally (e.g., what if one country conducts a survey in lean season, and another in harvest season)
- iii. Not be comparable within the same country over time.

Apart from South Sudan (2 months for the 2009 baseline survey) and Burundi (9 months distributed across 3 agricultural seasons), all the other countries' surveys are spread across 12 months.

Recommendation 6: Data collection for poverty measurement surveys should spread over 12 months of fieldwork to capture seasonal variation in food consumption and expenditure patterns. In addition, as much as possible, enumeration should be equally spread throughout the days of the week and the month.

- 22. Mode of interview and data collection:** Accumulated experience shows that digitisation of data collection leads to reduced cost, improves the quality of field data, and drastically cuts down on the time taken to make statistical information available to data users. NSOs should fully embrace the use of Computer Assisted Personal Interviewing (CAPI) - a method of in-person interviewing where an electronic device such as a tablet, smart phone, or computer is used during the household interview to simultaneously display interview questions and record responses. While CAPI has potentially higher upfront costs, given the necessary initial investments in hardware and capacity, the benefits outweigh these and include:

- i. Data is available faster, as data is entered during the interview rather than in a separate subsequent stage.
- ii. Data quality controls are similarly incorporated into the interview process itself, increasing the likelihood of more accurate data.
- iii. Interviews can be made more efficient by programming questionnaire flow instructions (such as skip patterns and enabling conditions) into the interview

- software, minimising the likelihood of enumerator error and ensuring accurate administration of the questionnaire; and
- iv. With electronic survey instruments, interviewers can also capture additional types of data more easily. Pictures, bar codes, and audio recordings can be captured through built-in devices (camera, microphone), while GPS measurements captured directly from the device minimise transcription errors (Oseni et al., 2021).

Recommendation 7: NSOs should use Computer Assisted Personal Interviewing (CAPI) and related modern technologies to reduce time and cost and, minimise errors in data collection and processing.

2.3 Questionnaire design – consumption module

23. All Partner States use consumption expenditure in the measurement of poverty. Consumption is less variable over a period of a year, much more stable than income in agricultural economies and makes it more reasonable to extrapolate from one week, two weeks to a month or year for a survey household. Accordingly, the focus of the guidelines is the consumption module of the questionnaire.

2.3.1 Food consumption at home

24. Various studies have shown that the design and implementation of survey instruments for collecting consumption data considerably affects resulting measures such as consumption expenditure and ultimately poverty estimates. Factors such as the recall period and the number of food items listed have a large effect on the resulting measure of estimated food consumption (refer to Box 2). Thus, it is important that the design of data collection is harmonised across the region if the resultant poverty estimates are to be comparable. The following subsections delve into this.

25. **Recall versus diary and length of reference period:** Within the EAC region, there is substantial variation both within and across countries in the design of consumption modules (refer to Table 2). Such variations hinder cross country comparisons of poverty and living standards as well as efforts to study changes in poverty over time (Lanjouw and Lanjouw, 2001).

Table 2: Methods of data collection for food consumption in the region

Country	Method of data collection	Reference/recall period
United Republic of Tanzania	Diary (individual and household level)	14 days
Burundi	Diary and recall (Starting from 2019/20 only recall data will be used for computation of official poverty statistics)	9 days diary 7 days recall

Country	Method of data collection	Reference/recall period
Kenya	Diary and recall (only recall data is used for computation of official poverty statistics)	14 days diary 7 days recall
South Sudan	Recall	7 days
Rwanda	Recall and bounded recall. Data from bounded recall is used for computation of official poverty statistics	Recall and bounded recall approach (successive 8 visits per household over a period of 16 days) for rural and successive 11 visits per household over a period of 33 days in urban areas
Uganda	Recall	7 days

Source: Survey reports from NSOs

26. There is limited consensus on how to best collect consumption data yet design and implementation of survey instruments matters: Despite the centrality of consumption-based welfare measures, there is still limited consensus on how best to collect consumption data. For instance:

- i. Should data be collected by interviewers asking households to recall consumption over a period of time (recall design) for a set of items?
- ii. Should they be asked to fill a diary (diary design)?
- iii. What should the duration of the recall or diary be?
- iv. What is the reasonable number commodities that should be tracked in the surveys and the degree of commodity detail?
- v. What is the appropriate recall period for the different goods?
- vi. Yet, evidence shows that questionnaire design choices matter for results on consumption, poverty, nutrition etc.

Box 2: Impact of survey design on consumption estimates: Evidence from Tanzania, Kenya, and Niger

Using a validation experiment in Tanzania, Beegle et al. (2012) tested a variety of relatively common ways of collecting information about consumption, contrasting diary with recall, frequently supervised diary with infrequently supervised diary, household versus individual diary, shorter recall with longer recall periods, and varying levels of disaggregation of the listed commodity items. They compare eight alternative variations in the design of consumption modules against the benchmark - a personal consumption diary with intensive and frequent supervision. If questionnaire design did not matter, results from data collected using different questionnaires should not differ much. They then demonstrate differences in measured consumption by survey method of choice and suggest that the resultant poverty and inequality measures from consumption expenditure are drastically affected by the use of diary versus recall, shorter versus longer reporting periods (recall), and changes in the number of consumption items. **The differences in poverty estimates from the benchmark measure**

(high intensity personal diary) in Beegle et al. (2012) are between 7 and 19 percentage points higher.

In Kenya, using two survey modules (the recall and diary modules) in the 2005/06 Kenya Integrated Household Budget Survey (KIHBS), Wambile et al., 2016 find that on average, **diary-based consumption per adult equivalent is considerably lower than that of recall by approximately 7 percent.** They also found that the poverty estimates – food, absolute, and so on – based on consumption from diary are consistently higher than those from recalled consumption. At the national level, the absolute poverty from the diary is 2.2 percentage point higher than that from recalled consumption.

In Niger, Backiny-Yetna (2014) assess the impact of three methodologies of food data collection on the welfare distribution, and poverty and inequality measures in Niger. The first methodology was a 7-day recall period, the second one a usual month, and the third one was a 7-day diary. **The paper found that there is a difference in the distribution of welfare between, on the one hand, the two first methodologies (7-day recall and a usual month, which give results close to each other) and, on the other hand, the 7-day diary method.** When considering annual per capita consumption, the 7-day diary lags the 7-day recall by 28 percent. This gap is not only at the mean of the distribution, it has been found at any level.

Existing evidence does not yet provide firm conclusion on measured consumption across survey methodology. In some cases, expenditure from diaries were found to be higher than those from recall and in other cases they are less or similar (e.g. 2006 World Bank study on Bosnia & Herzegovina)

27. Should food expenditures be recorded via a diary or recall? which approach is better in terms of collected data quality: As earlier noted, empirical evidence shows that the method chosen can significantly affect the resulting estimates of consumption (refer to Box 2) and other measures⁶. Both methods of data collection have pros and cons and they both have the potential to generate measurement errors, for different reasons.

28. Diary: While a well-implemented diary is generally considered as more accurate for measuring consumption (Beegle et al. 2012); Chibuye, M. (2011)), diaries are far more demanding in terms of supervision, especially with low literacy respondents and when they are implemented as a series of short recall interviews. As a result, the theoretical benefits of diaries often fail to materialise because of measurement errors that may arise during survey implementation and maintenance of diaries. Moreover, they tend to become more expensive and demand higher capacity (FAO and World Bank, 2018). Any survey using diary methods must be closely supervised to ensure proper completion,

⁶ Gibson et al. 2015, de Weerd et al. 2016)

especially in areas where illiteracy rates are high. The reference period should not exceed 14 days (Oseni et al., 2021).

29. **Recall:** On the other hand, recall surveys are affected by memory decay (memory loss) as the recall period increases, and telescoping error (reporting of consumption outside of the recall period) for shorter periods. “Bounding” the recall period for a household with another visit to mark the beginning of the recall period can, in principle, help reduce telescoping and improve the quality of the recall. However, there is not yet enough evidence that it offers significant advantages in data quality, while it is more costly to administer.

Box 3: Summary of likely challenges with recall and diary methods of data collection

Problems with recall	Problems with diary
<ul style="list-style-type: none"> • Memory can fail biases related to length of recall period. <p>Long recall period</p> <ul style="list-style-type: none"> • Tendency to forget, or memory decay. • More likely if expenditure is perceived as ordinary, not salient. • Leads to under-reporting of consumption. <p>Short recall period</p> <ul style="list-style-type: none"> ▪ Telescoping: tendency to mistakenly report consumption that has actually taken place outside the recall period ▪ More likely if expenditure is perceived as extraordinary, salient ▪ Leads to over-reporting of consumption 	<ul style="list-style-type: none"> ▪ In principle, diary avoids memory fallibility, as it is compiled close to the moment in which events (consumption or purchase) occur. In practice, diary keeping introduces other problems: ▪ Respondent burden and fatigue, particularly when diary length increases: evidence of “diary exhaustion” (Brzozowski, Crossley and Winter 2017; Gibson 2013) ▪ To reduce these issues, high levels of supervision are needed, which imply high implementation costs. ▪ In practice, more often than not, the diary is simply recall. If the households fail to fill the diary, interviewers help them recall. If the household is illiterate and consequently cannot fill the diary, interviewers also fill the diary form as a recall instrument.

30. While a diary approach may be the “gold standard” with close supervision and careful implementation, in practice, its implementation has challenges. The implications of literacy variation, motivation, and other factors, suggest that it can be quite difficult to conduct a high-quality diary survey, regardless of issues related to respondent recall bias. Given the trade-offs between diary and recall, it is recommended that, for now, Partner States use a seven-day recall period for collection of data on food consumption. Any change in recall period or data collection method (diary vs. recall) should be accompanied by an experimental component aimed at assessing the change in survey estimates. The ultimate objective is to obtain a reasonably accurate estimate of each household's total

consumption expenditure over the previous year. The research findings from various experiments seem to suggest that on average, a 7-day recall with a long list of food items performs well compared with more expensive and burdensome methods, such as the administration of food consumption diaries at the household and individual level, with the latter often considered the gold standard (FAO and World Bank, 2018; Beegle et al, 2012; World Bank 2015).

Recommendation 8: It is recommended that Partner States implement recall interviews with a 7-day recall period for collection of food consumption data with a long list of food items, as this method provides a good balance between accuracy and cost-effectiveness.

In the transition process, any change in recall period or data collection method (diary vs. recall) should be accompanied by an experimental component aimed at assessing the change in survey estimates. The experiment helps to disentangle the extent to which the change in measured poverty is real and how much was caused by the change in data collection method.

For comparability with previous trends, for Partner States switching to the 7-day recall, the two data collection methods may be implemented concurrently until Partner States are comfortable with the change.

- 31. Modes of acquisition:** All surveys should collect data on all main modes of food acquisition.

Recommendation 9: Partner States should always collect data on all modes of acquisition: purchase, own production, in-kind/gift receipts.

- 32. Coverage of food items:** The number of food items on which data are collected is one of the central issues in designing a consumption module. The accuracy of food consumption estimates depends on the length, specificity, and structure of the food list, the sequencing of individual food items (Fiedler and Mwangi, 2016).

Using drastically shorter questionnaires (about 15 items) is likely to be risky and may lead to the under-estimation of total consumption (FAO and World Bank, 2018) and would decrease the analyst's ability to calculate estimates of caloric content which are used to calculate the poverty line. It is considered good practice that the food list is as comprehensive as possible. Excluding entire categories of foods leads to underestimation of consumption. A highly disaggregated list is thought to be important as it prompts respondents to more completely and accurately remember their consumption. On the one hand, longer consumption modules are more costly and crowd information out of other modules of the questionnaire. Too detailed list of items might have a negative effect, increasing enumerator and respondent fatigue, leading to measurement errors.

- 33.** A universally valid solution does not exist because the optimal quantity of items strongly depends on a country's food consumption habits. Accordingly, a food list must be country specific, representative of the dietary and consumption habits of all segments of a

population and capture evolving trends in dietary patterns. While food lists will inevitably be country-specific, some rules-of thumb or general guiding principles can be identified to help survey designers determine food lists to capture food consumption and expenditure information that is disaggregated in a way that can be useful for dietary quality analysis and welfare analysis. Fiedler and Mwangi (2016) suggest that to meet all of those requirements, in most cases a list of 100 to 125 items is needed (this translates into about 5-6 items per COICOP class). However, this can only be seen as an indicative rule of thumb. Partner States are implored to compile a matrix of product availability and importance using the existing items in the COICOP classification as a guide. Only items that are available in the country and are considered important in that country can then be included in the food list. Besides, useful information about the frequency and importance of each food item's dietary and expenditure patterns can be drawn from previous household surveys or dietary survey data carried out in a given country.

Recommendation 10: To ensure comprehensiveness of food items:

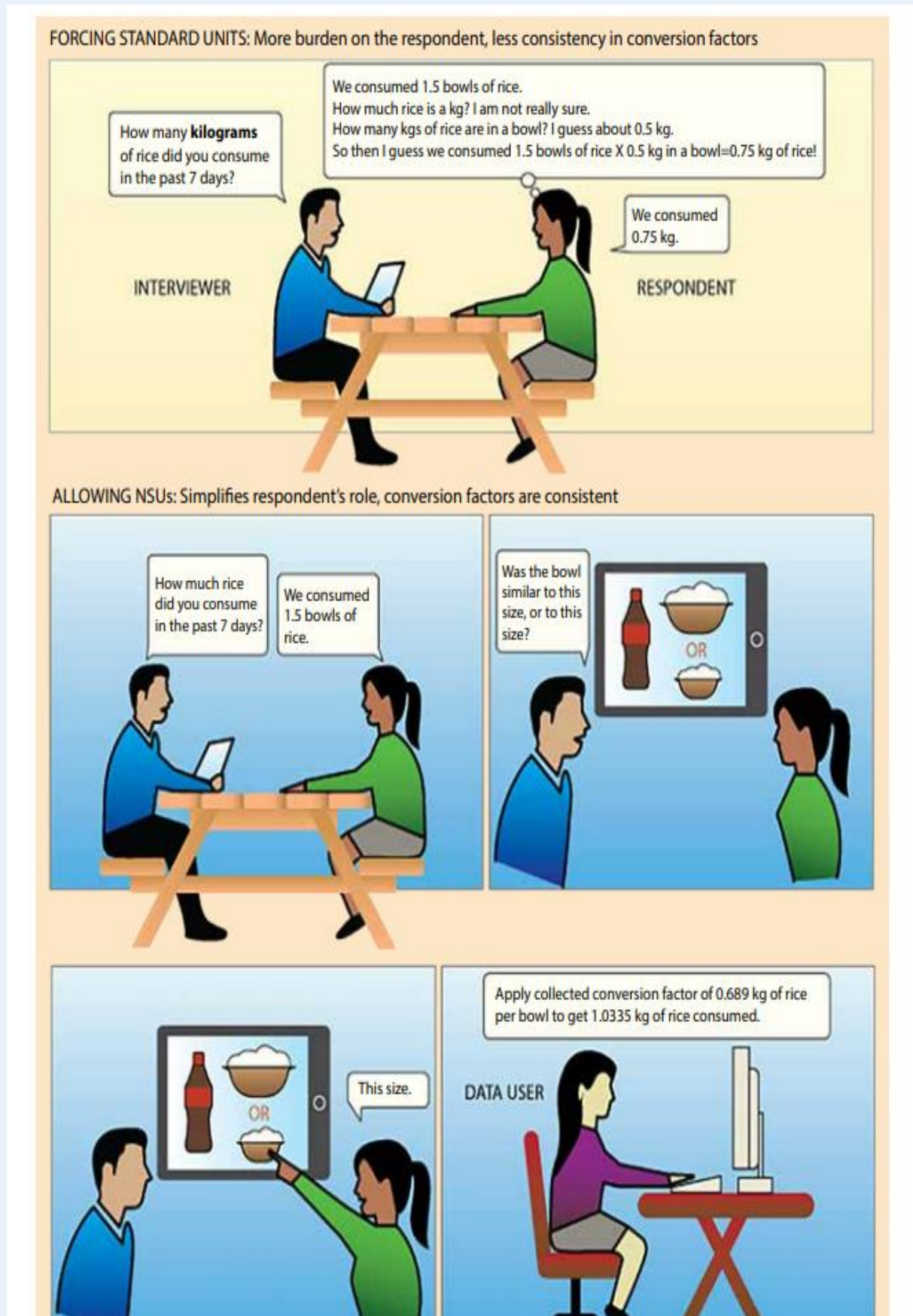
- a) It is recommended that survey designers use the COICOP classification system for purposes of collecting consumption data. There should be presence of food items from all the food classes as per the COICOP classification. Partner States are implored to compile a matrix of product availability and importance using the existing items in the COICOP classification as a guide. Only items that are available in the country and are considered important in the country can then be included in the food list. Frequency and importance of each food item's dietary and expenditure patterns can be drawn from previous household surveys or dietary survey data carried out in a given country;
- b) The list needs to include a reasonable number of individual items (the most common ones) for each of the main food classes. A residual/ "other" category should be added when relevant (e.g. "other fruits" or "other vegetables") to record the acquisition or consumption of additional food items. Such categories should remain marginal as quantities cannot be collected under those categories and food matching is imperfect;
- c) Food items that are the object of product-specific government subsidised programs should be listed individually on the food list; and
- d) Foods that are fortified or have the potential to be the vehicle of food fortification programs (e.g., iodised salt, fortified flour or cooking oil) should be listed individually in the food list.

- 34. Acquisition versus consumption.** It should be made clear to respondents, enumerators, and data users whether the survey is collecting data on food acquisition or food consumption or both. In some cases where food can be and is stored over long periods of time, "food consumed" should be distinguished from "food acquired/purchased". For consumption from own production, the question must be worded to clearly indicate food consumed from own production rather than all food harvested. When this distinction is not made, the quantities or expenditure reported may include food entering the households' production stocks – not for immediate consumption – and as a result, food consumed from home production is systematically overestimated.

Recommendation 11: Surveys should be designed so that the distinction between acquisition and consumption is clear. Use of filter questions on consumption to rule out acquisition (and vice versa) should be avoided.

35. Non-standard units (NSUs) of measurement. One important aspect of collecting information on food consumption and agricultural production is the choice of units in which respondents can report quantities. The practice in some surveys has been either to limit households to reporting in standard units such as kilograms, pounds, litres, etc. or to have enumerators estimate the conversion to a standard unit on an ad-hoc basis, both of which can be very problematic and lead to poor estimates. Forcing respondents to report only in standard units simplifies the use of the data (since aggregation/analysis of food-item consumption often requires a common unit of measure) but it can impose a significant cognitive burden on the respondent, which in turn can reduce the accuracy of the resulting data.

Figure 1: Forcing standard unit conversion versus allowing non-standard units



Source: World Bank Living Standards Measurement Team

Recommendation 12: To improve the accuracy of food consumption estimates, surveys should allow respondents to report in both standard and non-standard units, according to what they are most familiar with for each item reported.

- 36. Implementation of Non-Standard Units (NSUs) during the main surveys:** While allowing NSU reporting will eliminate some burdens for the respondent, it does not mean the issues of NSU conversion disappear. Instead, it falls to the survey or research team to acquire the necessary information to take NSU quantities from respondents and convert them to common standard units. It is critical to establish (define or collect) conversion factors and photo reference aides for all non-standard units that will be used. This exercise should be conducted as a separate survey that strictly precedes the household survey, since the outputs of the NSU survey serve as inputs for the consumption module of the household survey. To this end, survey implementers should thoroughly document all non-standard unit protocols and related conversion factors and make them publicly available.
- 37.** The list of allowable NSUs should be programmed into the main survey, limiting responses to only valid options. Use the photo reference guide to help standardise the reported NSUs. Record originally-reported units and quantities; neither respondents nor enumerators should be required to convert quantities into standard units in-situ. Instead, CAPI can be used to apply conversions during on-site data validation checks, upload conversion factors as reference tables, and program in-situ checks for invalid and unlikely values by computing item rankings by consumption quantities, reasonable per person calorie intakes overall or per item, and so on (Oseni et al, 2021). Within the EAC, Uganda and Tanzania have libraries of conversion factors under the panel survey program. Burundi also has an existing library of conversion factors for common NSUs. For illustration purposes, Annex 2 shows an excerpt from a table of conversion factors for Uganda.

Recommendation 13: To ensure availability of valid conversion factors for the NSUs reported, a specialised market survey for the production of conversion factors for non-standard quantity units should be conducted prior to the household survey. In countries where libraries of NSUs and conversion factors exist, they should be continually updated with new NSUs and conversion factors.

In addition, photo reference guides of the most common NSUs should be prepared and used (shown to respondents during the household survey to help standardise the NSUs).

- 38. Minimum data to be collected per purchased food item:** Some household budget surveys usually contain information about both the quantities consumed of each item and the expenditure on each item, whereas some surveys do not. The same source of information should ideally provide information on quantities and prices/unit values, in case an external source of information on prices is not available.

Recommendation 14: For all purchased food items, the survey should contain information on the value/expenditure and quantity. Information on expenditure alone does not allow for a price/unit value check.

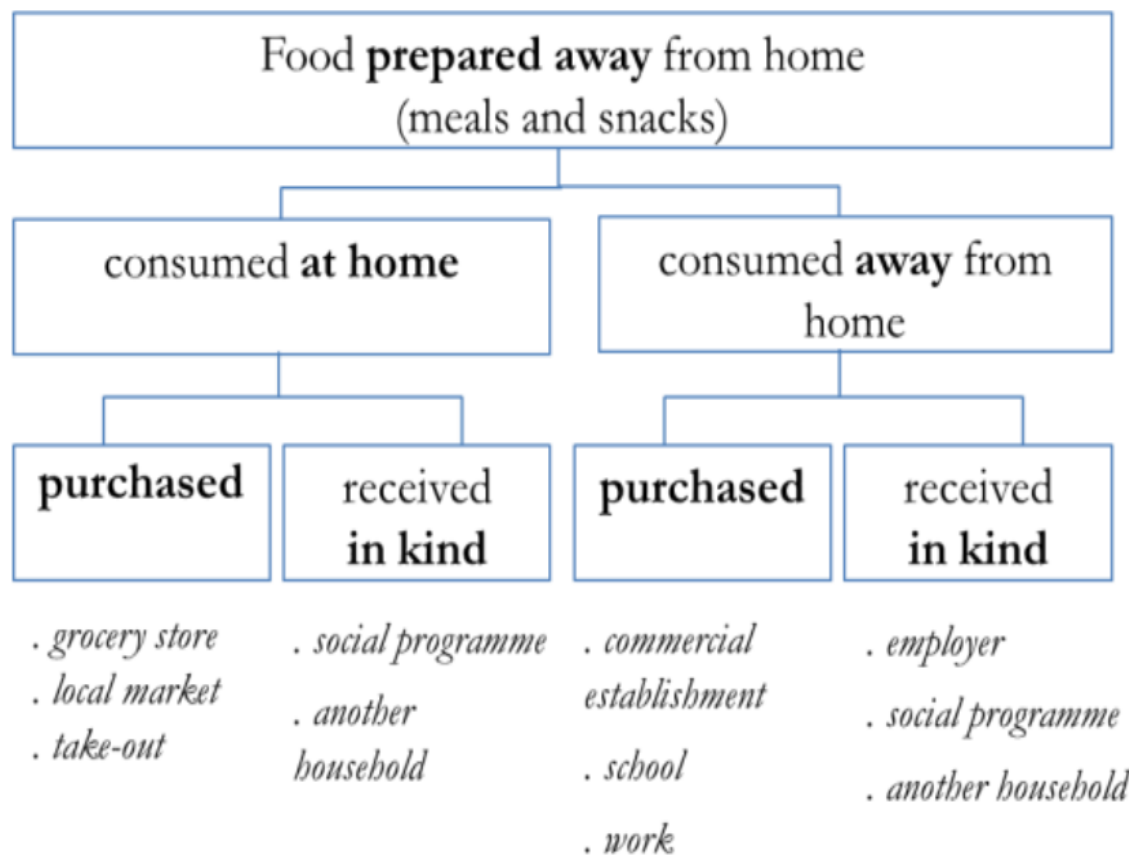
To deal with issues related to use of unit values, a price survey should be conducted at the time of household survey data collection. This will enable survey teams to collect the price levels faced by respondents for either all or frequently consumed basket of goods.

2.3.2 Food consumption away from home

- 39. Food away from home:** Consumption patterns are rapidly changing across the developing world, with prepared and packaged meals and meals consumed outside the home taking an ever-growing share of households' food budget. As food away from home gains importance, failure to appropriately measure this component of food consumption and expenditure would make comparisons of consumption patterns and poverty less and less meaningful.
- 40. The practice of collecting food away from home information with just one question should be discontinued.** The importance of food away from home warrants the design of a separate module based on a clear definition of food away from home. In particular, surveys should be clear in identifying how to collect information on potentially ambiguous categories of food: "food prepared at home and consumed outside" and "food prepared outside and consumed at home."

The figure below provides a useful way to conceptualise and measure food away from home.

What to measure?



Source: Extracted from FAO and World Bank 2018: Food data collection in household consumption and expenditure surveys: Guidelines for low- and middle-income countries

41. Data collection for food away from home should be organised around meal events, including snacks and drinks. At a minimum, surveys should collect information on the monetary value of each meal consumed away from home (breakfast, lunch, dinner, solid snacks, and drinks). The meal events list should be adapted to the local context. Food away from home is best collected through individual-level interviews of adults. A proxy respondent can be used to report on children's meals away from home and other adults. Surveys should use the same reference period for food away from home as the one used for the food consumed at home module. The data to estimate food away from home-related nutrient content, when feasible, will have to come from other data sources integrated to household survey, such as a survey of food establishments or administrative data on the content of public meals (e.g. schools and social programs).

Recommendation 15: The increasing prevalence of 'food away' from home warrants the design of a separate module based on a clear definition of food away from home. Data collection should be organised around meal events, including snacks and drinks and surveys should use the same reference period for food away from home as the one used for the food consumed at home module.

2.3.3 Non-durable and durable goods submodule

42. **Expenditure data on non-food non-durable goods and durable goods:** Household surveys for poverty measurement collect information on a wide range of items; for example, data are collected on consumption of daily-use items such as soap and cleaning supplies, kerosene and petrol, newspapers, stationary and supplies, transport, recreational expenses and miscellaneous personal care items, as well as other less frequently purchased items such as clothing, footwear, kitchen equipment, household textiles such as sheets, curtains, bedcovers, etc., and other household use items. Data is also collected on education and health expenditures for all household members. Data on these should ideally be collected through the recall approach since they are not daily (frequent) expenditures. Just like for food items, we recommend the use of COICOP classification for non-food goods.

Recommendation 16: Data on non-food goods and durables should ideally be collected through the recall approach since they are not daily (frequent) expenditures. We recommend the use of COICOP classification for non-food goods.

Since the COICOP list may be too extensive resulting in both interviewer and respondent fatigue, Partner States are implored to compile a matrix of availability and importance using the existing items in the COICOP classification as a guide. Items that are available and important in the country can then be included in the list of non-durable and durable goods. All major COICOP sub-classes should be covered.

43. **Reference periods for non-durable and durable goods:** Data on purchases of non-food items are often collected for different recall periods, for example over the past 7 days, 1 month, the past 6 months, or the past 12 months, depending on how frequently the items concerned are typically purchased. Constructing the non-food aggregate thus entails converting all these reported amounts to a uniform reference period—say one year or —, and then aggregating across the various items. The summarised proposed recall periods are presented in Table 3 and for detailed proposed recall periods, refer to the EAC HCES model questionnaire.

Recommendation 17: Use different recall periods, for example over the past 7 days, 1 month, the past 6 months, or the past 12 months, depending on how frequently the items concerned are typically purchased.

Table 3: Reference period for food, non-food/non-durable and durable goods

	Recall (7 days)	Recall (1 month)	Recall (6 month)	Recall (12 month)
Household consumption groupings				
1. Food and non-alcoholic beverages	X			
2. Alcoholic beverages and tobacco	X			
3. Clothing and Footwear			X	
4. Housing, Water, Electricity, Gas and other Fuels		X		
5. Furnishings, Household Equipment, and routine household maintenance				X
6. Health		X		X
7. Transport		X		X
8. Information and Communication	X	X		X
9. Recreation, sport and culture		X		X
10. Education				X
11. Restaurants/Food away from home	X			
12. Personal Care goods		X		X

2.4 Data Issues

44. **Data issues:** No data is perfect; each step of the survey can generate errors in the data or the published statistics. Even when working with high quality data, one must usually contend with issues such as missing data, extreme values, inaccurate or implausible records, and more. It is becoming more and more frequent for statistical institutions to embed data quality safeguards into the early stages of data collection; for instance, checks for out-of-range values and flags for missing data can be hard-coded into computer assisted data collection systems. With the widespread adoption of these methods, measurement error is expected to decrease significantly (Mancini and Vecchi, 2022). This notwithstanding, an extensive process of checking the collected data should be carried out and where necessary, adjustments may be necessary. This subsection discusses missing data and outliers and is largely based on guidelines by Mancini and Vecchi, 2022.

45. **Missing data:** Missing data are a special type of error requiring special attention. Missing data are unobserved values that would be meaningful for analysis if observed; a missing value hides a meaningful value (Mancini and Vecchi, 2022). Missing data imply loss of precision ('large' standard errors) and potential bias of the parameter estimates. The loss of precision is a direct consequence of the smaller sample size stemming from the missing data. The types of missing data may be unit non-response or item non-response.

i. Unit non-response:

A non-respondent unit (an individual or a household) is any unit for which survey data are not obtained because of refusal (persons who adamantly refuse to be interviewed), non-contact (like the case of persons who reside at home but are temporarily away), and a number of other reasons. Unit non-response poses a growing threat to the reliability of survey weights.

ii. Item non-response:

Item non-response refers to missing values of particular items in the questionnaire (when a respondent has completed the questionnaire, but some answers/responses are missing).

46. The potential for bias from missing data is usually of far greater concern, and it all depends on the underlying non-response mechanism (reason why data are missing). To unpack the underlying non-response mechanism, we focus on two different mechanisms: Missing completely at random (MCAR) or Missing at random (MAR) and Missing not at random (MNAR).

47. Technically, when missing data are MCAR, the probability that a value is missing does not depend on the value of the target variable or on the values of auxiliary variables. Under MCAR, there is no reason to believe that missing data are different from observed data: the observed data can be regarded as a random subset of the complete data.

How to decide whether data are MCAR or MNAR? Investigating the pattern of missingness in the sample is paramount, before embarking on any action (data editing, dropping records, no action at all). Even two-way tables where the distribution of missing values is examined by region, urban-rural areas, and other dimensions are often insightful, despite their simplicity. If evidence suggests that data are missing not at random (MNAR), the mechanism referred to as non-ignorable missingness, observed data cannot be treated as if they were random sample of the complete data. This can threaten the representativeness of certain survey estimates.

Recommendation 18: Unit non-response: The best way to mitigate unit non-response is to prevent it from happening by maximising compliance ex ante at the survey implementation stage. In the case where ex post adjustments become necessary, the involvement of a sampling specialist is advised. It is recommended that the documentation accompanying the final estimates explicitly address unit non-response and how expansion factors (weights) were handled.

Recommendation 19: Item non-response: Always assess the extent to which item nonresponse affects the consumption aggregate through its elementary components. If the incidence of missing data is a concern, the nature of missingness should be investigated.

If data are missing at random (MCAR and MAR), a number of approaches are available to mitigate the impact of missing values on the statistics of interest. In both cases, random and non-random item nonresponse, the recommendation is to report how any corrections were handled in the documentation accompanying the final estimates. If there is evidence that data are MNAR, the problem is more serious and requires developing ad hoc imputation models.

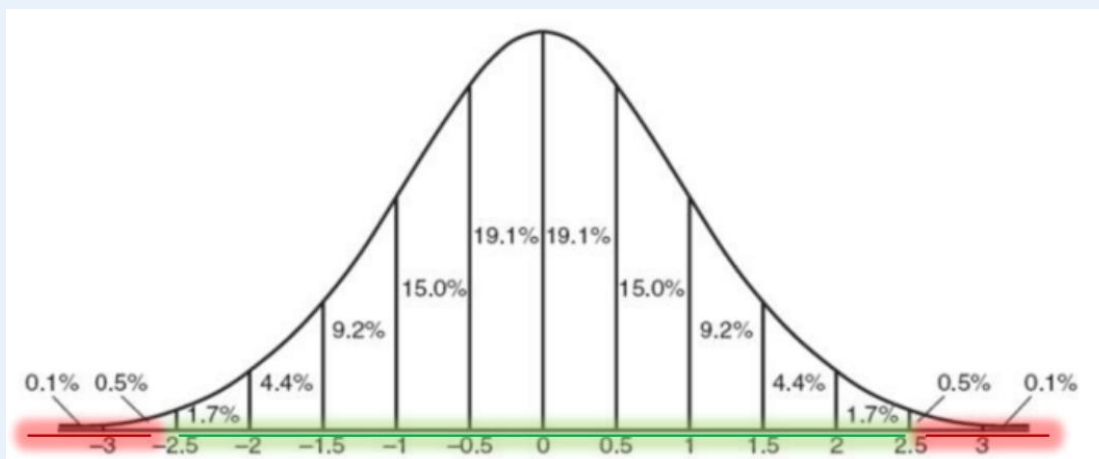
48. **Outliers:** An outlier is an observation “that appears to deviate markedly from other members of the sample in which it occurs” (Grubbs, 1969 as cited in Mancini and Vecchi, 2022). Simply put, these are values that are either too small or too large compared to the bulk of the data. Outliers may be genuinely abnormal and may in principle represent novel and important information. An outlier, be it an error or not, may not be influential. Whether outliers matter at all depends on the context, and more precisely on the statistic of interest. Inequality estimates, for instance, tend to be extremely sensitive to the presence of extreme values. On the other hand, poverty estimates are generally insensitive to what happens above the poverty line, regardless of how extreme the top values are (Mancini and Vecchi, 2022).

However, it is hard to deny that in the specific settings frequented by welfare analysts, for the specific distributions that are routinely analysed (consumption expenditure, calorie intakes, unit values, and so on), extreme values are typically seen as potentially inaccurate, and the need for examining the data and detecting outliers is not questioned; rather, the debate is focused on methodology. The overall conclusion from both the theoretical literature and empirical applications is that the detection and treatment of outliers cannot be an afterthought. The application of a consistent methodology to detect extreme values, paired with careful documentation of their treatment, would be a step forward in the direction of comparability and transparency of final estimates (Mancini and Vecchi, 2022).

49. **Detection and diagnostics of outliers:** Outlier detection entails deciding what makes a value “extreme” in the context at hand. Outlier treatment is deciding what to do about it: replacing or otherwise rejecting the extreme value, versus leaving it as is. Regarding outlier detection, analysts regularly resort to both “subjective” approaches and “objective” rules. The former are often based on manual or visual inspection of the data: checking the largest and smallest values of a given variable, graphing its distribution, and so on, and determining whether or not anything “looks off.” Naturally, this can be difficult to decide, and even more difficult to document. In many cases, analysts find it useful to apply “objective” outlier detection rules which are pre-determined statistical criteria to flag extreme values. Typically, such rules rely on some definition of distance from the bulk of the distribution, and on the identification of a threshold beyond which this distance is considered “too large,” so that observations falling past it get flagged (Mancini and Vecchi, 2022).

50. To specify a threshold for deciding whether each observation is an outlier or not, most analysts use common rule of thumb thresholds: conventionally an observation is considered an outlier if it is more than 3 standard deviations far from the mean of the distribution. This is sometimes called the “three sigma rule”. Why the number three (3)? Under the assumption of normality $Z_\alpha = 3$ implies that outliers are in the region where $\alpha = 0.1$ percent of observations are (see normal distribution picture below).

Figure 2: Why three standard deviations as the threshold?



Recommendation 20: Extreme values represent a potential threat to the unbiasedness of consumption statistics, poverty, and inequality estimates. It is essential to check the variable(s) of interest and assess the incidence of outliers before producing final estimates. In addition, it's important to conduct sensitivity analysis, e.g., by comparing results obtained for key indicators with and without the inclusion of outliers.

Irrespective of the method used in terms of outlier detection and treatment, careful documentation of their treatment/what was done, would be a step forward in the direction of comparability and transparency of final estimates.

3. CONSTRUCTION OF THE NOMINAL CONSUMPTION AGGREGATE

51. In order to estimate poverty, we need three main variables:

- i. **Welfare indicator**, used to derive a distribution of living standards
- ii. **Poverty line**, a threshold below which individuals are classified as poor
- iii. **Poverty measures**, provide summary statistics of poverty in the population/aggregate poverty figures

In this chapter, guidelines and recommendations on how to choose and estimate the welfare indicator are discussed.

3.1 Choice of welfare indicator

52. **Consumption expenditure:** Consumption is the use of goods and services to directly satisfy a person's needs and wants, whilst consumption expenditure is the value of consumption goods and services consumed by a household. While consumption is only one dimension of welfare, it is arguably an important one that shows whether a household has enough monetary resources to meet its needs. Considered simply, and everything else being equal, people with lower levels of consumption or consumption expenditure can be regarded as having lower levels of current economic wellbeing (UNECE, 2017).

Box 4: The choice of a monetary indicator

The main decision in monetary poverty estimation is to choose between consumption and income as the welfare indicator to determine poverty. Consumption is the preferred measure because it is likely to be a more useful and accurate measure of living standards than income. The preference of consumption over income is based on both theoretical and practical reasons [(Deaton and Zaidi (2002); Haughton and Khandker (2009); Hentschel and Lanjouw (1996)].

Theoretically, both income and consumption can be considered approximations to utility (satisfaction attained from the consumption of a basket of goods and services), even though they are different concepts. Consumption measures what individuals have actually acquired while income, together with assets, measures the potential claims of a person. Secondly, the time period over which living standards are to be measured is important: if one is using a long-term perspective such as a lifetime period, both should be the same and the choice should not matter. In the short run though, say in less than a year, consumption is likely to be more stable than income. Households are often able to smooth out their consumption, which may reflect access to credit and savings as well as information on future streams of income. Consumption is less affected by seasonal factors than income: for instance, in agricultural economies, income is more volatile and affected by planting and harvesting seasons, and relying on such an indicator might significantly overestimate or underestimate living standards.

There are also practical arguments to consider. Consumption is generally an easier concept than income for the respondents to grasp, especially if the latter is from self-employment and family-owned business. While it is easier for workers in the formal sector to accurately report their wage or salary, the self-employed persons in the informal sector

or agriculture will have a harder time accurately estimating their income. Also, in these cases, household and business transactions are intertwined. Also, seasonal considerations are to be included in the estimation of an annual income figure. In terms of reliability of information, households are less reluctant to share information on consumption than income. They may think that the collected information on income may be used for other purposes such as taxation, or they may just consider questions on income to be intrusive. It is also likely that households know more about the household consumption than their levels and source of household income.

Source: Deaton and Zaidi (2002); UNECE (2017).

Recommendation 21: For measurement of poverty across the EAC, it is recommended that consumption expenditure be the main welfare measure, given its widespread usage among the Partner States and its advantages as spelt out in the literature.

53. A uniform approach to poverty measurement requires a uniform measurement of consumption aggregate. We provide guidelines for the three-step procedure for constructing a consumption-based measure of welfare:
- i. Aggregation of different components of household consumption to construct a nominal consumption aggregate.
 - ii. Construction of price indices to adjust for differences in prices faced by households.
 - iii. Adjustment of the real consumption aggregate for differences in household size and composition
54. **Household nominal consumption aggregate:** The nominal consumption aggregate may be defined as the value of all goods and services consumed by members of the household during the reference period. The construction of the consumption aggregate may be decomposed into four main categories:
- i. food items.
 - ii. non-food non-durables items;
 - iii. durable goods; and
 - iv. housing.

Although most surveys for poverty measurement contain the four categories, the number and type of specific items included under each category varies. In this subsection, we discuss the aforementioned categories and provide recommendations on their measurement. The recommendations are largely informed by guidelines provided in Deaton and Zaidi (2002) and Mancini and Vecchi (2022).

3.2 Food aggregate

55. **Food aggregate:** Food is a fundamental component of living standards. Subsequently, the value of all food consumed during the reference period must be included in the nominal consumption aggregate. In constructing a food consumption aggregate; all that is needed are data on the total value of all food items consumed in the reference period, or else on the total quantities of different food items consumed as well as a reference set of prices at which to value them. Since households consume food obtained from a variety

of different sources, it is important to include food consumed by the household from all possible sources.

Recommendation 22: The food consumption aggregate should include:

- Food consumed from purchases.
- Food consumed from home-production (own production)
- Value of food that is consumed out of the home (amount spent in restaurants, prepared foods, meals at school, work, vacations etc)
- Food consumed from items received as gifts, in-kind or remittances from other households.

Calculating the food sub-aggregate involves converting all reported expenditures on food items to a uniform reference period—say one year or a month—and then aggregating these expenditures across all food items consumed by the household. Although seemingly straightforward, constructing it poses empirical challenges related to the availability of all the essential information in household survey questionnaires and the quality of the resulting data.

- 56. Acquisition versus use/consumption approach:** There are various theoretical approaches for measuring household consumption expenditure. The acquisition approach includes goods and services upon their acquisition or once they are taken possession of. They are accounted for irrespective of whether they have been paid for or whether they have been used. With the use approach, goods and services are included when they are used, regardless of when they were acquired or paid for. In line with current international best practice recommendations, we recommend distinguishing between the value and quantities of food items acquired or purchased and the quantities consumed from the purchases/acquisitions during this period.

Recommendation 23: The use/consumption approach (the value of food consumed) closely equates to consumption and should be the one included in the food aggregate. This is because it is the use of food not its mere acquisition, that contributes to well-being.

- 57. Own production and food received in kind:** Own consumption refers to food that is consumed from the household's own production. It is a major component of food consumption in rural areas. This implies that their monetary value must be estimated, which boils down to identifying suitable prices for each food item. Most commonly, the information comes from household surveys in two forms: self-reported valuations and unit values from food purchases. In other cases, the information may be obtained from external sources such as price surveys conducted from local markets within the enumeration areas. Food received in kind or as gifts is food that the households receive from sources outside the household.
- 58. Self-reported valuations:** The monetary values placed on these self-produced and in-kind food items in surveys are often the values that respondents themselves suggest.

The analyst may readily add these self-reported valuations to the food consumption aggregate. However, there are grounds for questioning the reliability of these respondent-reported values. Many households who produce a certain food do not buy that same food, so they may not be well informed about prices when they assign a value to their own food production. Moreover, the items available for sale in markets may be of a different quality than their own production so even if they are aware of prices in the market, they may not be able to accurately impute a value for their own production. There are two alternatives to respondent-reported values, as measures of the value of self-produced food items. These are discussed in the next paragraphs.

- 59. Unit Values:** When the food purchases section of the questionnaire allows it, the analyst may compute unit values for each food item, defined as the ratio between the amount paid to purchase a given quantity, and the quantity itself. Unit values may then be used to price the quantities of food items that were own-produced or received in kind (Mancini and Vecchi, 2022). The first step is to value self-produced foods with the average of the implicit unit values used by other households in the same cluster/primary sampling unit (PSU) as the respondent. These implicit unit values are similar to a price except that they may reflect quality variation and also measurement error. Replacing respondent-reported values with a cluster average (medians being more robust than the means against outliers) removes the within-cluster variability in valuations. If the PSU contains enough (at least 40%) observations, then the PSU-level median unit value is used to price food items that were own-produced or received by the target household. Otherwise, the analyst moves up to the next administrative level and computes median unit values in the same subregion (district, region or any “fine” territorial unit available in the dataset) as the target household (Mancini and Vecchi (2022).
- 60. Price surveys:** The second alternative is feasible only if a survey has collected prices from local markets. In this case it is possible to value self-produced foods with the average price that was observed during the survey in the market closest to the respondent. It is notable that both of these alternative ways of valuing self-produced foods switch the cornerstone of consumption measurements from the respondent reports of values to the survey estimates of food production quantities.

Recommendation 24: If consumed food was produced by the households or received from elsewhere as gifts or in kind, the market value of the food items should be included as consumption expenditure.

Unit values may then be used for pricing food items from own production or from in-kind received food items. It's advisable to use the median or mean price (subject to checks that such prices are plausible) paid by households within the cluster/primary sampling unit, Otherwise, the analyst should proceed to the next administrative level and compute median/mean unit values within the same subregion or a higher-level area if necessary.

Since unit values are usually affected by quality bias, countries are implored to undertake price surveys alongside the household survey and use these prices for the valuation of own production and goods received in kind.

3.3 Non-food non-durables aggregate

61. As in the case of food, non-food consumption is somewhat a straightforward procedure; all that is needed are data on the total value of the various items consumed in the reference period. Unlike food items which are normally collected in one or two modules, non-food and nondurable commodities and services are scattered through different modules in the questionnaire. The first step should be to identify all the modules where these expenditures have been collected. The second step is the choice of items to include. The choice depends not only on which data are available, but also on the analytic objectives of the survey being undertaken. However, there are a few general issues that apply to the standard welfare analyses; these are discussed in the next subsections.
62. Unlike many homogeneous food items, most non-food goods are too heterogeneous to permit the collection of information on quantities consumed – with the exception of some fuels, like kerosene or electricity, and some transportation items. As a result, most surveys collect data only on the value of non-food purchases over the reference period. Data on non-food purchases are often collected for different recall periods, for example over the past 30 days, the past 6 months, or the past 12 months, depending on how frequently the items concerned are typically purchased. Constructing the non-food aggregate thus entails converting all these reported amounts to a uniform reference period—say one year or one month, and then aggregating across the various items. The key idea is to include the value of goods and services that are typically consumed during the survey period, and that positively contribute to the standard or living. The vital non-food items included in the consumption aggregate include expenditures on clothing and footwear, housing, education, health, fuel, utilities, housewares and & routine maintenance, transport, recreation, information and communication, personal effects etc. Using the COICOP 2018 classification, Table 4 adopted from Mancini and Vecchi (2022) provides guidance on what should be included or excluded in the nominal consumption aggregate (NCA).

Table 4: COICOP as a checklist for the construction of the consumption aggregate

COICOP	Description	Inclusion in NCA	Justification for exclusion of some items in NCA
1.1	Food	Y	
1.2	Non-alcoholic beverages	Y	
1.3	Services for food and non-alcoholic processing	N	These are essentially production expenditures in a family enterprise or in the process of producing food and non-alcohol items for the household's own consumption. As such, they are already incorporated into the value of the final product, and their inclusion would lead to double counting
2.1	Alcoholic beverages	Y	
2.2	Alcohol production services	N	Same as justification for Group 01.3
2.3	Tobacco	Y	Somewhat controversial, given that many of these items (tobacco and narcotics) may be harmful to one's health. A utility consistent approach is not paternalistic: respecting people's revealed preferences should be a fundamental principle of welfare analysis
2.4	Narcotics	Y*	
3.1	Clothing	Y	
3.2	Footwear	Y	
4.1	Actual rentals for housing	Y	
4.2	Imputed rentals for housing	Y	
4.3	Maintenance, repair and security of the dwelling	S	Only include expenditures on materials and services for minor maintenance and repair
4.4	Water supply and miscellaneous services relating to the dwelling	Y	
4.5	Electricity, gas and other fuels	Y	
5.1	Furniture, furnishings, and loose carpets	Y	
5.2	Household textiles	Y	
5.3	Household appliances	S	Some major household appliances are durables
5.4	Glassware, tableware and household utensils	Y	
5.5	Tools and equipment for house and garden	Y	
5.5	Goods and services for routine household maintenance	Y	
6.1	Medicines and health products	Y	However, lumpy/infrequent expenditures should be excluded. Refer to sub-section on health
6.2	Outpatient care services	Y	As above
6.3	Inpatient care services	Y	As above
6.4	Other health services	Y	As above
7.1	Purchase of vehicles	N	These are durables; include only the consumption flow
7.2	Operation of personal transport equipment	Y	
7.3	Passenger transport services	Y	
7.4	Transport services of goods	Y	
8.1	Information and communication equipment	S	Some are durables; include only the consumption flow
8.2	Software (excluding games)	Y	
8.3	Information and communication services	Y	
9.1	Recreation durables	N	These are durables; include only the consumption flow
9.2	Other recreational goods	S	
9.3	Gardens and pets	Y	
9.4	Recreational services	Y	
9.5	Cultural goods	S	

COICOP	Description	Inclusion in NCA	Justification for exclusion of some items in NCA
9.6	Cultural services	Y	
9.7	Newspapers, books and stationery	Y	
9.8	Package holidays	Y	
10.1	Early childhood and primary education	Y	
10.2	Secondary education	Y	
10.3	Post-secondary non-tertiary education	Y	
10.4	Tertiary education	Y	
10.5	Education not defined by level	Y	
11.1	Food and beverage serving services	Y	
11.2	Accommodation services	Y	
12.1	Insurance	Y	Represents consumption of a service, which is routine, discretionary, and welfare-enhancing
12.2	Financial services	N	Related to the purchase and management of financial assets, which are savings (or investment)
13.1	Personal care	Y	
13.2	Personal effects n.e.c.	S	
13.3	Social protection	Y	
13.9	Other services n.e.c	S	

Source: Extracted from Mancini and Vecchi (2022).

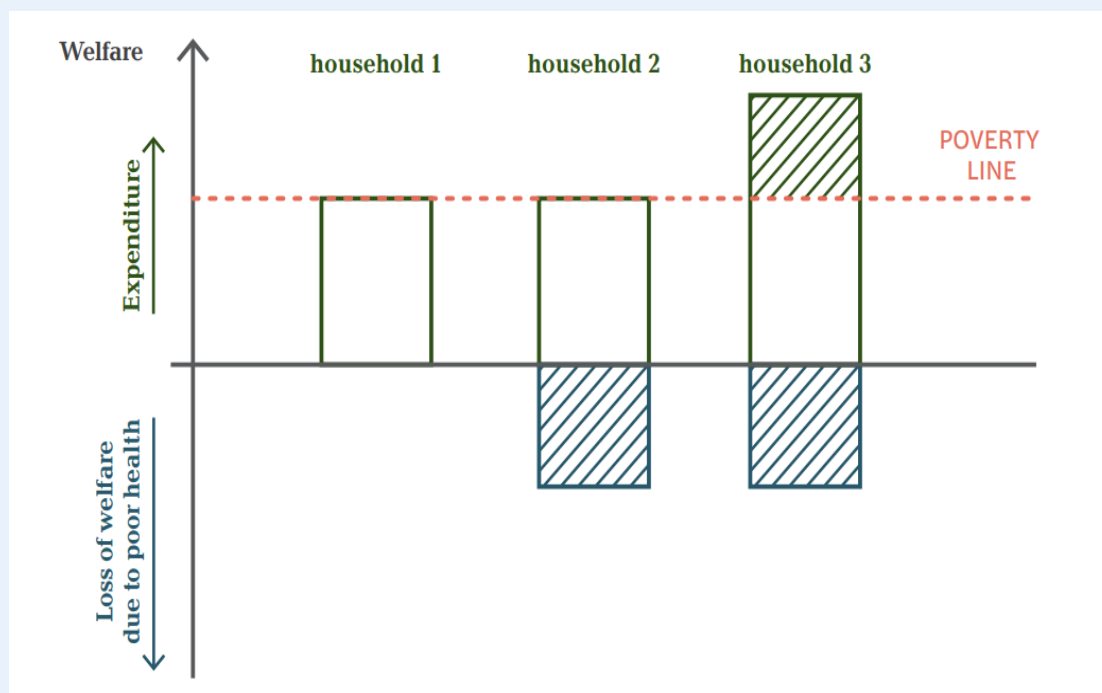
Note: Y = Yes, include in the NCA; N = No, exclude from the NCA; S = Some of the items in this category are to be included, some are not; N.E.C. = not elsewhere classified.

Recommendation 25: All goods and services with a YES in COICOP (2018) table 4 should be included in the Nominal Consumption Aggregate.

Two non-food non-durable categories deserve special attention: Health and Education.

63. Health: Whether to include or exclude health expenditures is a controversial decision. One argument for exclusion is that such expenditure reflects a regrettable necessity: an individual who falls ill is likely to spend a substantial amount of money which if added will increase total expenditures and therefore their level of welfare when in fact, the opposite has occurred (Deaton and Zaidi, 2002). The fundamental problem here is our inability to measure the loss of welfare associated with being sick, and which is (presumably) ameliorated to some extent by health expenditures. Including the latter without allowing for the former is clearly incorrect, though excluding health expenditures altogether means that we miss the difference between two households, both of which face health challenges, but only one of which pays for treatment (household 2 and 3 in Figure 3). Furthermore, it is challenging to acquire complete information on financing of health expenditures as people may have insurance leading to distorted comparisons. Insured households may register small expenditures when some member has fallen sick, while uninsured ones, bigger amounts.

Figure 3: The fundamental problem with health expenditures and welfare measurement



Source: Extracted from Mancini and Vecchi (2022)

64. Another argument in favour of excluding health expenditures from the NCA has to do with their irregular and unpredictable nature. Expenditure on health is often a lumpy and infrequent expenditure over the reference period and a decision has to be made regarding its inclusion or exclusion. It should be stressed that, as noted by Deaton and Zaidi 2002, this reasoning does not apply to all health expenditures. Some items, such as preventative care, dental care, cosmetic procedures, and so on, are discretionary and disjointed from a concurring health crisis. This makes them entirely similar to all other “uncontroversial” expenditures and justifies their inclusion in the consumption aggregate. On the other hand, some components of health expenditure may be classified as “lumpy.” Households tend to consume health care in response to negative shocks, and in some contexts, this means having to spend large sums. The “lumpiness” and infrequency of these health expenditures would suggest exclusion from the consumption aggregate, in accordance with the principle of having to proxy typical consumption.

In practice, most Partner States include all health expenditures in their consumption aggregates except Kenya which includes only regular purchases of certain over-the-counter medication, Rwanda which includes only a selected number of expenses and Burundi that excludes assistive health durables (Table 5)

Table 5: Treatment of health expenditures in Partner States

	Partner State	Inclusion of health
1	Rwanda	Includes basic medicines, medical consultations, medical exams and health insurance
2	Kenya	Partly included. Only regular purchases of certain over the counter medication are included. Other infrequent health related expenditures such as doctor and hospital fees are excluded for purposes of poverty analysis
3	South Sudan	Includes all health expenses
4	United Republic of Tanzania	Includes only out of pocket health expenses (excludes insurance)
5	Uganda	Includes all health expenses
6	Burundi	Includes some health expenses and excludes durable health assistive devices

Source: Poverty reports from NSOs

Recommendation 26: Health expenditures should be included. However, lumpy/infrequent health expenditures should be excluded.

65. Education: Educational expenditures, like health expenditures, would ideally be smoothed over life. There is also the argument that education is an investment, not consumption, and should be included in saving, not in the consumption aggregate (Deaton and Zaidi, 2002). There are also lifecycle considerations as educational expenses are only concentrated in a particular time of a person's life. Say if we compare two (2) individuals that will pay the same for their education, but one is still studying while the other finished many years ago. The current student might seem better off due to the higher reported spending on education, but the result is just related to age and not the true differences in welfare levels. One way to avoid this is to smooth these expenditures over the whole life period but that option is not possible with the available data since we observe the individuals at one point in time. In addition, there is the issue of public education. If all of the population can benefit from free or highly subsidised education, the decision to study in private schools is driven by quality factors, then differences in expenditures can be associated with differences in welfare levels and the case for inclusion is stronger. Excluding expenditure on education would make no distinction between two households with school going age children, but only one being able to send them to school. Although education may be looked at as an investment, not consumption, and should be included in saving, not in the consumption aggregate, we follow common standard practice and recommend that expenditures on education be **included** in the consumption aggregate.

66. Energy: Another non-food component that deserves attention is energy consumption, that is expenditure on energy sources of lighting and cooking such as electricity, gas, generator fuel, kerosene, charcoal, firewood etc. In principle, this is comprehensive enough to capture energy consumption. However, in practice, households may tend to report only purchases, and not to value any fuel collected for free. For

comprehensiveness, expenditure on all energy sources should be included in the consumption aggregate.

67. As earlier noted, goods and services should be included in the consumption aggregate only if they represent typical consumption during the survey reference period and are welfare enhancing. When we say that the consumption aggregate represents welfare during the reference period, the underlying assumption is that what is observed in that time interval will be a good representation of the welfare typically enjoyed by households during a generic year (Deaton and Zaidi 2002; Mancini and Vecchi 2022). However, any empirical evidence on a household's consumption will reflect contingent behaviours, those that took place in that particular year or month. If a household spends a fortune on a special celebration during the survey period, such as a marriage, the resulting spike in measured consumption is genuine enough, but unrepresentative of typical living standards for that household. This argument leads to the exclusion of infrequent (or "lumpy," or "bulky") expenditures from the consumption aggregate year (Deaton and Zaidi 2002; Mancini and Vecchi 2022).

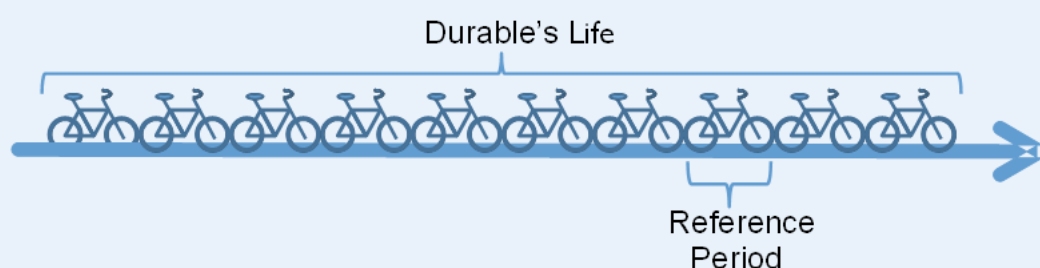
Recommendation 27: The construction of the non-food/non-durable aggregate should **exclude** certain items.

- Taxes (which are considered a deduction from income and not an expenditure) and current transfers to government.
- Expenditures that are not welfare enhancing such as fines
- Capital transactions such as purchases of financial assets, debt/loan and interest rate payments.
- Lumpy and infrequent/occasional expenditures such as marriages, dowries and funerals.
- Remittances given to other households. The rationale for this is to avoid double counting because most likely these transfers are already reflected in the consumption of the recipients.
-

3.4 Durable goods aggregate

Consumer durables: Ownership of durable goods (assets) such as cars, household appliances etc. is an important component of the welfare of households. Given that such goods typically last for many years, their price corresponds to the value of the durable good for its entire economic life. This requires special treatment when calculating total expenditure because their useful life typically spans a time-period greater than the interval for which the consumption aggregate is being constructed. Consequently, the right measure to estimate, for consumption purposes, would be the stream of services that all households derive from all durable goods in their possession over the reference period and not the total expenditure/purchase price (Deaton and Zaidi, 2002). Within the EAC, only Rwanda includes the consumption flow in her consumption aggregate.

Figure 4: Durable's life versus consumption flow over reference period



Source: Adopted from World Bank training material

68. Estimating consumption flow from durable goods: The challenge lies precisely in understanding which fraction of the purchase value is used up during the reference period, an amount that is rarely, if ever, directly observed (figure 4). In technical terms, the analyst's task is to estimate the consumption flow from durable goods. The flow of utility is unobservable, but it can be assumed to be proportional to the value of the good. The principle implies getting the difference between selling the asset at the beginning and the end of the year. The consumption flow corresponds to the opportunity cost, which is the difference in the sales price and the foregone earnings on interest if the asset is sold at the beginning of the year.

69. Data needs for estimating the consumption flow from durable goods: Most surveys conducted within the region ask households about the number of items owned and their current value, but unfortunately many do not ask about their age. Calculating the consumption component would thus involve making assumptions about the depreciation rate of all the durables and their ages, which may result in imprecise estimations. The model EAC questionnaire proposes key questions that are aimed at solving this challenge of inadequate data collection. The optimal case is to have data on the current price of the item, the price at the time of purchase and the date of purchase/age of durable good. With this information, a depreciation rate for each durable good can be estimated, in order to determine the value that should be assigned as expenditure in the relevant measurement period. The consumption flow is estimated by:

- i. First obtaining the vintage/age of each item from the information collected.
- ii. Second, estimating depreciation rates and obtaining the median depreciation rate for each item across all households to be used in the calculation of the consumption flow.
- iii. Third, deriving the consumption flow assuming, inflation, interest rates and the median depreciation rate converted into a monthly value.
- iv. For households that own more than one of the same durable good, the consumption flow is multiplied by the number of items owned

Recommendation 28: Estimate the consumption flow from all the owned consumer durables based on the user cost method and estimate the depreciation parameter using the geometric model (assumes the depreciation rate to be constant over time).

If the information required by the geometric model is not available, use the economic life depreciation model.

3.5 Housing aggregate

70. Housing conditions are considered an essential part of people’s living standards. Given the size of investment required, for a majority of families housing is the most valuable among the durable goods they consume and is a crucial component of any consumption aggregate that aspires to be comprehensive (Mancini and Vecchi, 2022). Conceptually, housing is identical to other durables when it comes to computing its contribution to the consumption aggregate; the measure of the flow instead of the stock, payments in rent is a more appropriate choice. A home, once purchased, delivers utility to the consumer for an amount of time that exceeds the typical survey period of one year. The acquisition of a house is a large and relatively rare expenditure, and it should never be included in the welfare aggregate as is (Deaton and Zaidi, 2002).

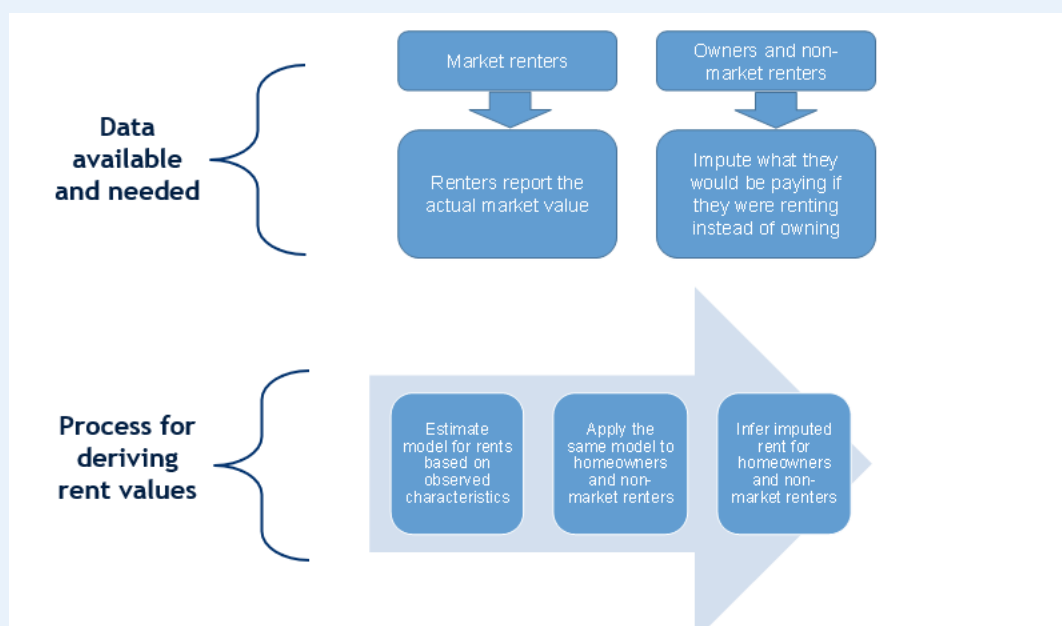
Table 6: Current practices on housing within Partner States

	Partner State	Treatment of housing
1	Rwanda	Includes rent for both renters and imputed rent for homeowners
2	Kenya	Actual rent is included for renters. Imputed rent for owners is done for ONLY urban households and excludes rural households
3	South Sudan	Excludes rent
4	United Republic of Tanzania	Excludes rent
5	Uganda	Includes rent for both renters and imputed rent for homeowners
6	Burundi	Includes rent for both renters and imputed rent for homeowners

Source: Household survey reports from NSOs

71. **Measuring the value of housing services for renters:** Unlike most other durable goods, housing generally has a rental market, and household surveys almost always record rent paid. Because rent is precisely the market value of occupying a house for a given period of time, it is theoretically correct, and in many cases, empirically viable estimate of the flow of housing services using the rental equivalence approach. For renters, their consumption aggregate should reflect the monetary value of the service provided by the dwelling to the renter that is, actual rent.

Figure 5: Estimating housing aggregate



72. Measuring the value of housing services for homeowners and non-market tenants:

Many households own their dwelling and values on rent are not observed for this category of households. Furthermore, not all tenants pay the market price for their dwellings, as they may enjoy subsidised arrangements, live for free in a dwelling provided by their employer or by a family member. Households that own their dwellings and non-market tenants/renters enjoy housing services that should be considered as part of consumption. To rank households correctly, the analyst must estimate, or impute, an implicit rental value (more commonly known as imputed rent) for owners and non-market tenants, and capture the value of their consumption of housing services.

“If we were to compare them to market tenants (households renting their home at the market rate) based solely on annual housing expenditures, we would place the living standards of homeowners and nonmarket tenants at a systematically lower level: in fact, all else being equal, the owner of a mansion purchased before the survey period would appear to be poorer than someone who rents an apartment (the consumption aggregate for the former would be zero in the rent category, while the latter would include a positive amount)”, Mancini and Vecchi (2022).

73. Self-reported imputed rent: Most household consumption and expenditure surveys within the EAC do record the dwelling occupancy status of households, sorting them into owners, tenants, subsidised tenants, and households occupying dwellings provided to them for free by the owner. For the owners (and sometimes non-market renters), a follow-up question to estimate the amount they would have to pay (receive), if they were to rent (lend) the dwelling they are currently occupying on the market is asked. Such estimates are called self-reported (or self-assessed) imputed rent.

If these self-assessments are reliable, the analyst may simply treat them as if they were actual rent values, for both homeowners and non-market tenants — a simple solution indeed for the rent imputation problem. In practice, it may yield imprecise estimates as some people may not be aware of market rents while others are not objective about the

value of their dwelling. This is further exacerbated by the fact that rental markets are concentrated in urban areas, while rural populations typically own their homes, with no actual rent exchanges happening around them at all.

According to the 2019/20 Uganda National Household Survey, 90.2% of rural households in Uganda reported being homeowners while 3.8% reported to be living in dwellings for free/not paying rent (UBoS 2021). Similarly in Tanzania, 85.2% of rural households reported to be home owners while 7.8% reported to be living in dwelling for free/not paying rent (2017/18 Tanzania Mainland Household Budget Survey, NBS 2020)

When rental markets are “thin” (i.e., small, with few transactions), respondents may simply not be informed enough to come up with a realistic estimate of the rental value for the house they occupy. Moreover, self-reported imputed rent is sometimes affected by “owner pride” effect where owners tend to “place above market values on special features of their dwellings. For these reasons, the reliability of self-reported imputed rent should always be carefully assessed. The analyst should always carry out some preliminary analysis to test the accuracy of self-assessments. Is the distribution of self-reported values reasonable, given the context? Are there systematic differences between self-reported and actual rent?

74. Hedonic rent imputation: Another approach to rent imputation is that of hedonic rent imputation methods. This refers to the idea that “a household’s rent is a function of the characteristics of its dwelling, including location, structural attributes (e.g., size, type of construction, number of rooms, age of the building, etc.), whether it’s connected to utilities such as water and electricity and other neighbourhood characteristics”. The choice of regressors is to a large extent determined by the information available in the housing module, and local knowledge helps to select relevant variables. In particular, if rental markets are segmented (i.e., if the same dwelling characteristics are likely to be valued differently in different locations, say densely packed urban areas versus suburban areas), the analyst should consider adding dummy variables and interactions to control for the segments (Mancini and Vecchi, 2022).

75. The standard procedure is to estimate, for those households that rent their dwellings, a function that relates the rental payment to the aforementioned characteristics (Haughton and Khandker, 2009).

This gives the following: Rent =f (area/size of house, running water, year built, type of construction (roof, floor, walls), location, number of rooms.....)

The estimates based on this “hedonic” regression are then used to impute the value of rent for those households that own, rather than rent, their housing. For all households that own their housing, this imputed rental, represents the annual/monthly consumption of housing services (Haughton and Khandker, 2009).

Recommendation 29: The consumption aggregate should reflect the monetary value of the service provided by the dwelling to the homeowner that is, actual rent (for renters) or imputed rent for homeowners. The imputations may be checked against self-reported ones.

Simply put, if a household pays rent, use the amount of rent paid. If the dwelling is owned by the household or received free of charge, an estimate of the rental equivalent must be included in the consumption aggregate.

76. **In summary, nominal household consumption aggregate** = expenditures on food and non-food (non-durable) goods and services consumed + value of in-kind consumption for food and non-food (non-durable) goods + housing rent for home renters and value of use value of owner-occupied housing for home owners + consumption flow from durables.

4. ADJUSTMENTS TO THE NOMINAL CONSUMPTION AGGREGATE

After the total nominal consumption aggregate is calculated, two further adjustments need to be made. One relates to differences in prices faced by households in different locations and at different periods. The other adjustment considers the different composition and number of members across households.

4.1 Adjusting for cost of living

Two households who report the same nominal expenditure but face different prices are not able to afford the same quantities of goods: therefore, their nominal expenditures cannot be thought of as indicating the same level of welfare. Instead, nominal amounts conceal differences in the cost of living, making the household facing higher prices “worse off,” all other things being equal, than the one facing lower prices.

77. Price data: The conversion of nominal values to real expenditures requires the construction of a price index. To construct a price index, price information must be available. There are a variety of alternative sources for price data, including:

- I. Unit values from the household purchases reported in the survey,
- II. Prices collected in a price questionnaire administered in the PSU, and
- III. Ancillary data, for example, from CPI surveys.

78. Unit values from the survey: Household surveys often ask respondents to report expenditure values and quantities of purchased food items. Unit values can be computed as the ratio of expenditure to quantity. Unit values are often regarded as a proxy for the prices paid by the households (Deaton 1988, 1998). Unit values provide information for computing a price index for each household without requiring the formulation of assumptions about where the household buys its goods. Moreover, to the extent that the household survey is nationally representative, these unit values cover the entire country and are available for the different strata of the survey. This makes them potentially useful for intra-survey (spatial or seasonal) price adjustment, in addition to inflation adjustment across surveys.

However, unit values may not reliably measure prices because of quality variations in the underlying products⁷. Unlike specialised price surveys where enumerators are instructed to collect prices for well-defined products, unit values are computed at the level of aggregation at which the survey collects expenditures (Gaddis, 2016). Unit values also cannot be suitably defined for most non-food items. Physical quantities are difficult to define for non-food items and are usually not recorded in household surveys. Also, quality variations tend to be large. As countries develop and households spend an increasing share of their budgets on non-food goods, unit values will cover an ever-declining share of household consumption (Mancini and Vecchi, 2022). Even though unit values may be considered a useful source of price data, the above points render unit values a noisy and

⁷ Quality bias may be checked by summarising median unit values by item and by per capita expenditure decile. The presence of a steep gradient would be taken as evidence of a non-negligible quality bias (Mancini and Vecchi, 2022)

potentially biased proxy of prices. One way this problem can be dealt with is by averaging the unit values over all the households in a primary sampling unit to gain protection against extreme values and excessive heterogeneity in household-level unit values.

79. Market price survey /Community level prices: The alternative to collecting prices from households is to collect prices at the community level, specifically at village and local markets within the primary sampling unit. The price questionnaire seeks to measure prices in the markets actually patronised by survey households and in principle, provides a direct measure of what we need. This option is cheaper because prices are collected only for each primary sampling unit and not for each household.

However, there are practical difficulties. Survey enumeration areas do not always correspond to actual villages with a common market centre. Moreover, in urban areas, people may buy goods far away from where they live. So, there is no guarantee that the prices in any given local market are the prices actually faced by households in the survey. Furthermore, because price data can only be collected for items that are available at local markets (which may exclude many non-food items as well as those food items only consumed seasonally), missing values are a common problem. Finally, the process of price data collection via enumerators may not reflect purchases by local residents because the latter are characterised by repeated interlinked transactions, opportunities for bargaining, and so on. This is the preferred source for pricing data when household quantities are not individually collected. It is also the sole source for those goods, particularly non-food items where quantity observation is inherently impractical (Deaton and Zaidi, 2002).

80. Consumer Price Index Data: National statistical offices regularly collect consumer price data for the purpose of computing the monthly CPI. The main advantage of consumer price data collection is its frequency: most prices are collected monthly or quarterly. A problematic feature of the consumer price data collection for the purpose of measuring poverty is that price data are often collected only from urban areas.

Adopted from Gaddis, 2016, Annex 3 summarises the advantages and disadvantages of the three sources of price data most commonly used for poverty measurement, that is, unit values from household budget surveys, market prices collected in conjunction with household surveys for poverty measurement, and consumer price data (unit records from the CPI effort). Each source is evaluated with respect to a set of characteristics desirable for the purpose of poverty measurement. These traits are:

- i. Nationally representative: Price data should be representative at the national level and cover both urban and rural areas.
- ii. Representative for survey strata: Price data should also be representative at the survey strata-level (for example, regions) to allow for survey-internal deflation and strata-specific inflation rates.
- iii. Sample size: There should be a sufficiently large number of price observations per item.
- iv. Food and non-food coverage: Both food and non-food commodities should be covered.
- v. Precisely defined items: Items for which price data are collected should be exactly defined to avoid quality contamination.

- vi. Direct price measurement: To minimise measurement error, prices should be directly observed.
- vii. Collection process resembles actual transactions: The way the price data are collected should reflect as closely as possible the purchasing situation encountered by local residents.

The comparison (Annex 3) shows that no source of price data unambiguously dominates on all the traits evaluated. Consumer price data essentially mirror properties of survey unit values, while market price data come in between. In practice, analysts may have to use the different data sources in a complementary manner. It is thus imperative that National Statistical Offices implement household surveys that gather unit values complimented by price surveys.

81. Spatial price adjustment: Prices usually vary across different geographical domains in a country and these differences may mislead comparisons between households' nominal consumption expenditures (Gibson, 2007). Since people who live in different geographical domains pay different prices for comparable goods, nominal consumption must be adjusted for differences in purchasing power due price differences. Table 8 summarises the current practices across Partner States.

Table 7: Current methods used for spatial and temporal adjustments in PS.

	Method for spatial and temporal deflation
Kenya	Uses a Paasche price index based on median prices from the survey to adjust for spatial price adjustments.
Uganda	Food price index using prices from survey for spatial (rural/urban) and national composite CPI for inter-temporal (inflation).
Rwanda	First uses CPI data to establish food and non-food price indices at province level. Then uses an index based on a selected 'basket' of food and non-food items according to their relative weight in the budget share of the poorest households to generate end weighted Paasche poor person price indices.
Burundi	Estimates Paasche deflator and use the median prices per item.
South Sudan	For 2009 baseline survey, only accounts for spatial price variations since the survey was undertaken in seven (7) weeks and the assumption was the price changes during this relatively short time were not significant. Laspeyres index for urban and rural areas was used.
United Republic of Tanzania	Spatial and temporal price deflators were derived from survey data. Fishers index was used to deflate nominal consumption

Source: Poverty reports from NSOs

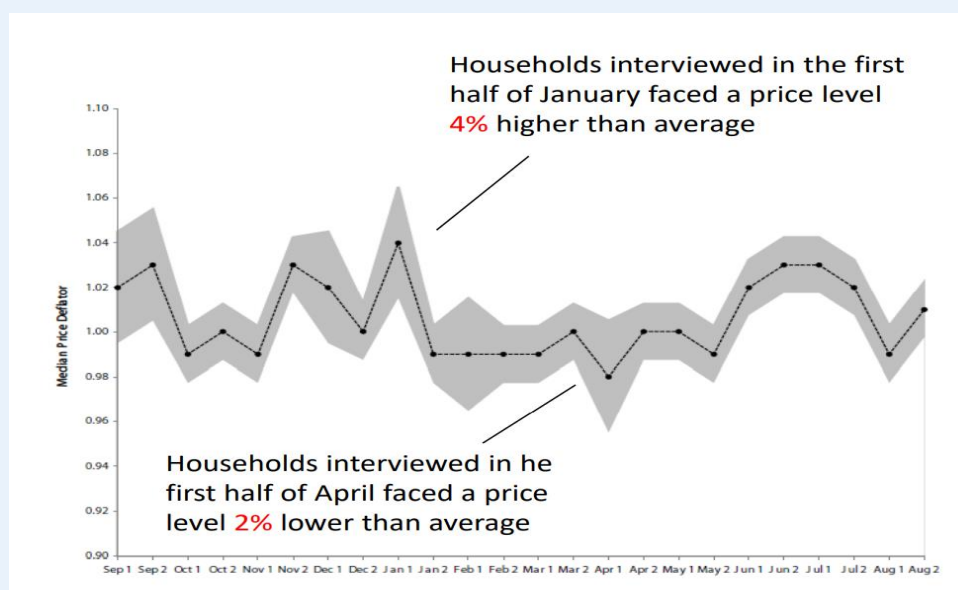
Paasche index: To address the spatial variation in prices, the literature suggests several indexes such as Paasche, Laspeyres, or two superlative indices, Fisher and Törnqvist. These price indices have advantages and disadvantages and do not satisfy the transitivity property. One practical challenge with all price indices is that they require a full set of prices for all items in the consumption basket. Unfortunately, household surveys are typically not able to collect prices for all consumption items. For example, non-food items

or services whose prices are clearly hard to measure. It is worth noting that the choice of index formula matters and Paasche and Laspeyres can take very different trajectories (Mancini and Vecchi, 2022).

The computation of a welfare indicator consistent with utility theory calls for a specific adjustment for cost-of-living differences: division by a Paasche price index. The Paasche price index is a household specific index that accounts for each household's expenditure pattern. It is the preferred price index for accounting for cost-of-living variations among different households (Deaton and Zaidi, 2002). In the temporal context, a Paasche price index uses current period (quantity) weights, not the base period. In the spatial context, the "current period" is replaced by the "household under consideration", and its purchases are used to weight prices relative to a base or reference prices. Perhaps the major practical point about Paasche price index is that the weights for the prices differ from household to household so that for example, two households in the same village, buying their goods in the same markets, and facing the same prices, will have different price indexes if they have different tastes or incomes.

82. Temporal price adjustment: When the price level of commodities and services changes over time, so does the purchasing power of money. Welfare comparisons must be carried out keeping constant the purchasing power of households. Since surveys are normally carried out over a period of twelve months, temporal price adjustments need to be done to account for seasonality of consumption. This is because prices usually vary across different time periods over the course of the survey due to inflation. Adjustments are necessary to avoid misleading comparisons between households' nominal consumption expenditures which are due to variations in data collection time periods. Figure 6 illustrates the importance of adjusting for temporal variation in prices during the survey period. It shows that during the 2015/16 Kenya integrated household survey, households interviewed in the first half of January faced a price level 4% higher than average while households interviewed in the first half of April faced a price level that was 2% lower than average. In this scenario, variations in nominal consumption aggregates computed over the survey period resulted from price fluctuations rather than genuine differences in living standards. It is good practice to divide computed nominal consumption aggregates by a monthly temporal price index, according to the interview date of each household.

Figure 6: Seasonal variation in median price deflator



Source: KNBS, 2018; The dashed line is the median Paasche for each 2-week survey cycle, and the 95 percent confidence interval is shaded.

Recommendation 30: We recommend estimating a Paasche index at the household level for spatial deflation. For simplicity, we recommend constructing a Paasche price index where each household's bundle of goods and services is evaluated, not at the prices they paid, but at a common set of prices preferably market price survey and unit values. In instances where such surveys are not available, median unit values at PSU level may be used.

Since surveys are carried out over a period of 12 months, it is advisable to also adjust for within-survey inflation by dividing computed nominal consumption aggregates by a monthly temporal price index, according to the interview date of each household.

- 83. Expenditure shares/weights:** For the purpose of poverty analysis, where own-consumed goods are typically included in the consumption measure and valued at (proximate) market prices, the weights of the price index should also include consumption from own production. For purposes of poverty analysis, the weights of the price index should include consumption from own production too.

4.2 Accounting for household composition differences

- 84. Household composition adjustment:** The final step in constructing a welfare indicator (consumption aggregate) involves moving from a measure of welfare defined at household level (since data is typically collected at household level) to individual level since the objective is to make comparisons across individuals and not households. One option is to adjust the consumption aggregate by household size (in per-capita terms) by assuming that all individuals in the household have the same needs and that consumption is shared equally among household members. The other option is to use equivalised

scales to adjust household resources in order to account for household composition and economies of scale⁸ like shared consumption, housing etc. Indeed, a review of the current practice in the Partner States shows that all of them, except South Sudan (which uses per-capita), use equivalence scales albeit with differences in adjusting the consumption aggregate. Equivalence scales are factors that reflect these differences and are used to convert all household members into unit equivalents/equivalent adults.

- 85. Methodologies for estimating equivalence scales:** Unfortunately, there is no agreement on a consistent methodology to calculate equivalence scales. While some scales are based on nutritional grounds, with children needing less food than adults, it is unclear why these scales are extended to non-food items. For instance, a child may necessitate more for educational expenses or clothing. Due to the lack of widely accepted methodologies for estimating equivalence scales, various methods for estimating them have been developed and used for producing estimates. The other commonly used equivalence scales are the “arbitrary” type of scales, e.g., the Oxford scale, OECD scale etc. While many different methods have been proposed in the literature to calculate the exact conversion factors used in each particular set of equivalence scales, the underlying principle is often the same: the basic idea is that various members of a household have “differing needs” based on their age, sex, and other such demographic characteristics, and that these different needs should be taken into account when making welfare comparisons across households (Deaton and Zaidi, 2002).
- 86.** Currently, all Partner States use different equivalence scales (see Annex 4), even though the choice of an equivalence scale has an effect on poverty and inequality estimates and hence hinders regional comparability. The majority of the Partner States (4 out of 6) use different variants of the nutritional based FAO/WHO methodology that computes the adult equivalent weight of any given age-gender group as the ratio of the energy requirement of an individual belonging to the group, and that of an adult male.

Box 5: The effects of different equivalence scales on poverty estimation

The choice of a particular equivalence scale depends on technical assumptions about economies of scale in consumption as well as on value judgements about the priority assigned to the needs of different individuals such as children or the elderly. These judgements inevitably affect results. For example, the poverty rate of individuals in households with a greater number of the elderly will be lower (and that of children higher) when using scales that give greater weight to each additional household member (Förster 1994). When choosing an equivalence scale, it is important to consider its potential impact on inequality, poverty, the size and composition of the poor population, and country rankings.

Sensitivity analyses suggest that while the level and, in particular, the composition of income poverty are affected by the use of different equivalence scales, trends over time and rankings across countries are much less affected (Burniaux et al., 1998).

Source: Extracted from <http://www.oecd.org/economy/growth/OECD-Note-EquivalenceScales.pdf>

⁸ Some goods and services consumed by the household have characteristics of a public good-consumption by one member does not necessarily prevent the other one from using it

87. To facilitate regional comparisons, a balance must be struck between applying country-specific approaches and ensuring regional comparability. Since no one knows precisely how needs vary with family size and composition, for comparisons across the region, we recommend using equivalence scales based on the different calorie requirements of individuals across different age groups. These scales are widely adopted in the region for their suitability. The use of caloric based equivalence scales can be justified by the fact that food still represents a sizable share of the household budget in the region. With caloric based equivalence scales, a (male) adult is typically chosen as a benchmark with his weight set to 1. Other individuals receive a weight that is less than 1 according to how much lower their cost is in terms of consumption expenditure, relative to a male adult. Children, for instance, might receive a weight of 0.25, or 0.33, or 0.50, implying that a child is expected to “cost” 1/4, 1/3, or 1/2 of the reference adult male, respectively. A similar reasoning may be applied to age groups and genders: females may consume less than males, older people less than younger ones, and so on. (Box 6 and Table 10 provide an example on how this can be done). It should be noted that the equivalence scales assume that non-food requirements vary by age in the same way that food requirements vary. Also, these scales do not allow for economies of scale that are likely to arise with larger households. Estimating non-food requirements by age or household economies of scale is a difficult exercise, seldomly attempted in poverty assessments (Appleton et al., 1999). It is advisable to explore the robustness of the results (for example, estimates of the poverty rate) to different equivalence scales.

Recommendation 31: Use equivalence scales to adjust the consumption aggregate. Given their widespread use within the EAC, we recommend equivalence scales that are based on 2001 FAO/WHO nutritional requirements (calorie needs) of individuals of different ages and sex.

Box 6: Computation of equivalence scale (ES) based on nutritional requirements.

The methodology based on nutritional requirements with the FAO/WHO methodology consists of computing the adult equivalent weight of any given age-gender group as the ratio of the energy requirement (ER) of an individual belonging to the group, and that of an adult male:

$$ES_{FAO/WHO} = \sum_i \sum_j N_{ij} \frac{ER_{ij}}{ER_{adult\ male}}$$

where N_{ij} denotes the number of household members in age range i and of sex j , and ER_{ij} denotes the corresponding energy requirements.

Note that the ER_{ij} coefficients are estimated based on the FAO/WHO technical tables, which provide the minimum calorie intake for individuals of different age, gender (with further distinctions for pregnant or breastfeeding women, working children, etc.), body size (height and weight), and physical activity level.

Source: Extracted from (Mancini and Vecchi, 2022).

Using the 2001 FAO/WHO technical tables and taking the energy requirement of 18-30 adult male as the reference/numeraire, Table 9 provides an example of how to

estimate equivalence scales based on daily caloric requirement for different age-gender groups.

Table 8: Example of equivalence scales derived from nutritional energy requirements based on moderate physical activity.

Age	Male		Female	
	Energy requirement	Equivalence scale	Energy requirement	Equivalence scale
0-1	651	0.21	600	0.20
1-2	950	0.31	850	0.28
2-3	1125	0.37	1,050	0.34
3-4	1250	0.41	1150	0.38
4-5	1350	0.44	1250	0.41
5-6	1475	0.48	1325	0.43
6-7	1575	0.52	1425	0.47
7-8	1700	0.56	1550	0.51
8-9	1825	0.60	1700	0.56
9-10	1925	0.63	1850	0.61
10-11	2150	0.70	2000	0.65
11-12	2350	0.77	2150	0.70
12-13	2550	0.83	2275	0.74
13-14	2775	0.91	2375	0.78
14-15	3000	0.98	2450	0.80
15-16	3175	1.04	2500	0.82
16-17	3325	1.09	2500	0.82
17-18	3400	1.11	2500	0.82
18-29.9*	3055	1.00	2538	0.83
30-59.9	2950	0.97	2405	0.79
60+	2450	0.80	2183	0.71

Source: Authors' calculations based on Energy Requirements from FAO/WHO/UNU, 2001

Notes:

- I. Age ranges are of the form x (inclusive) to y (exclusive) years e.g 0-1 refers to below one year of age.*
- II. Equivalence scales are gained by dividing energy requirements by the reference 3055 (energy requirements for an adult male aged 18-30 years).*
- III. For age band 0-1 years, ER is the average of ERs for 0-12 months (Table 3.2 in FAO/WHO/UNU 2001 report on human energy requirements).*
- IV. For age bands 1-18 years, ERs are based on "moderate physical activity" (Table 4.5 and 4.6 in FAO/WHO/UNU 2001 report on human energy requirements).*
- V. For age bands 18- 60+ years, ERs are based on a "Physical activity level (PAL)" of 1.75 and averaged over the continuum of mean weights (Table 5.4 to 5.9) 4.6 in FAO/WHO/UNU 2001 report on human energy requirements.*

5. SETTING A POVERTY LINE

88. A **poverty line** represents the aggregate value of all the goods and services considered necessary to satisfy the household's basic needs. Simply put, a poverty line typically specifies the level of spending income (or income) required to purchase a bundle of essential goods (food, clothing, shelter, water, electricity, schooling, and reliable healthcare, etc.). An individual or household is classified as poor if its resources are less than the value of a given monetary threshold –poverty line. Having a poverty line allows experts to count the poor, target resources, and monitor progress against a clear benchmark. Communicating the extent of poverty becomes easier, and explaining the notion of deprivation is simpler.
89. There are three major approaches to establishing a poverty line:
- I. The absolute poverty line (having less than an objectively defined absolute minimum)
 - II. The relative poverty line (having less than others)
 - III. The subjective poverty line (feeling that you do not have enough to get by)

The first approach (absolute poverty line) is the primary focus of these guidelines since all Partner States base on absolute poverty lines to estimate official poverty indicators.

90. **Absolute poverty lines** represent the cost of buying a basket of essential items that allows one to meet the absolute thresholds of satisfying certain basic needs. Absolute poverty lines are currently universally used in all EAC Partner States.

Recommendation 32: Use absolute poverty lines because they allow for transparent comparisons over time where changes in measured poverty can be attributed purely to changes in the distribution rather than to a moving poverty cut-off.

Setting an absolute poverty line using the cost of basic needs (CBN) approach: The way in which statistical offices set absolute poverty lines varies considerably. Most start with a cost of basic needs approach but the variations in the application of the approach multiply with each step. In most cases, the direct estimation of the normative basket which involves setting absolute standards, is restricted to food items. In this context, assessing sufficiency of food intake relies on an inherent threshold to which it can be compared (namely, the satisfaction of nutritional requirements). However, for non-food needs, there is no such obvious criterion for evaluation. We recommend the use of the CBN method for the estimation of an absolute poverty line as outlined in Ravallion (1994,1998). The preference for indirectly estimating the non-food requirement is because creating a list is not easy and the outcome is very sensitive to the contents of a highly subjective list. Additions to or subtractions from this list directly affects the total poverty line. This can easily give rise to questions about why one item is included while another is not.

91. Using a CBN involves estimating the cost of acquiring enough food for adequate nutrition, using a pre-defined number of calories per equalised adult per day and then adding the

cost of other essential non-food items such as clothing and shelter (gross up for non-food spending of the poor). The CBN poverty line is given by:

$$z^{CBN} = z^F + z^{NF}$$

z^F = Food component (linked to caloric requirements)

z^{NF} = Non-food component

Recommendation 33: In line with most literature, we recommend the approach of Ravallion and Bidani (1994) which focuses on defining food-related needs and only indirectly estimates non-food requirements.

5.1 Specifying a food poverty threshold

92. Computing the food poverty line involves several steps:

- I. Determining calorie requirements,
- II. Creating a food basket,
- III. Evaluating the cost of meeting the calorie requirements using the food basket. The cost of this basket is the food poverty line which is used to determine the proportion of the population that is unable to meet the minimum basic food consumption needs (i.e., the food poor).

93. **Food poverty line (FPL):** Adequate nutrition is one of the most basic human needs, and it is therefore, a central element in the construction of absolute poverty lines. Practices for constructing an absolute food poverty line can be classified into two groups:

- I. **Normative FPL:** This represents the cost of a healthy food basket that provides proper nutrition, but whose primary objective is not poverty measurement and therefore may not necessarily represent consumer habits.
- II. **Semi-normative FPL:** This represents the cost of a food basket that is anchored to certain nutritional guidelines according to the consumption habits and market prices faced by the population.

EAC Partner States currently use the semi-normative food poverty line, despite the various methodological variations in applying it.

Recommendation 34: Use the semi-normative food poverty line in which the food poverty line represents the minimum cost of attaining nutritional requirements while simultaneously respecting observed consumption patterns and habits.

94. Whereas the CBN approach is universally used across all the Partner States, there are variations in the way the approach is applied at various steps. There are differences regarding caloric thresholds, reference population for food baskets, and estimation of the non-food poverty line, among others. We delve into this in the next paragraphs.

Step 1: Determining energy requirements.

95. **Energy (caloric) requirements:** All Partner States use dietary energy (calories) as a proxy for overall nutritional status. The first step in defining a calorie-based poverty line

is specifying how many calories are "sufficient". Lipton and Ravallion (1995) identify the energy requirements set by WHO (1985) as the most widely used "official estimates". While most estimates of the energy (caloric) requirements are generally based on international standards of energy and protein needs for specific groups defined on the basis of age, sex and physical activity (FAO/WHO/UNU, 1985 and 2001), they have been operationalised differently in various contexts.

96. Even when using the WHO/FAO standards, there is considerable variation. Differences arise in part because the WHO/FAO standards are specified by age, gender, weight, and activity level but only age and gender are collected in typical household surveys. There is then considerable scope for variation in choices since different assumptions about the activity levels and average weights of the population will lead to different calorie standards.
97. Common practice is to establish thresholds of around 2,200 to 3,000 calories per adult equivalent per day. Hence, the EAC Partner States have drawn poverty lines based on varying caloric requirements, from a low of 2,200 kcal in United Republic of Tanzania to as high as 3,000 kcal in Uganda (Table 10). In its 2015 report, Rwanda acknowledged that the 2500 kcal per adult equivalent is rather ambitious and is at the higher end of the established minimums in the region (NISR, 2015).

Table 9: Caloric requirements used in poverty line estimation.

	Partner State	Daily per adult equivalent caloric requirements (Kcal)
1	Burundi	2,250
2	United Republic of Tanzania	2,200
3	Kenya	2,250
4	South Sudan	2,400
5	Rwanda	2,500
6	Uganda	3,000

Source: Survey reports from NSOs (Burundi-2019/20; URT-2017/18; Kenya-2015/16; South Sudan-2009; Rwanda-2016/17; and Uganda-2019/20)

Recommendation 35: Based on the caloric requirements established for different types of persons (as per WHO/FAO/UNU 2001 standards), a weighted average of the caloric requirements for the whole population should be computed, taking into account the population structure. This then results in an average caloric requirement per person (Table 11 presents an example).

Table 10: Example of how to estimate daily calorie intakes by age, sex and workload using WHO/FAO/UNU 2001 recommended daily calorie intakes and population structure of one of the EAC Partner States

Age group (years)	Sample Weighted Population		Energy Requirement	
	Male	Female	Male	Female
0-1	790,700	770,900	651	600
1-2	767,200	748,200	950	850
2-3	748,200	729,500	1125	1,050
3-4	731,200	712,700	1250	1150
4-5	714,400	696,400	1350	1250
5-6	697,800	680,300	1475	1325
6-7	681,300	664,300	1575	1425
7-8	665,200	648,700	1700	1550
8-9	655,400	606,600	1825	1700
9-10	619,800	578,100	1925	1850
10-11	619,800	578,100	2150	2000
11-12	603,000	563,800	2350	2150
12-13	595,100	556,500	2550	2275
13-14	589,500	551,200	2775	2375
14-15	581,700	551,400	3000	2450
15-16	567,700	541,100	3175	2500
16-17	553,900	531,200	3325	2500
17-18	540,800	522,200	3400	2500
18-29.9	5,386,500	5,619,900	3055	2538
30-59.9	4,541,900	5,247,400	2950	2405
60+	730,500	930,600	2450	2183
Total	22,381,600	23,029,100	Weighted Mean=2250	

Note: The population used is Uganda's projected population structure for 2022

Age ranges are of the form x (inclusive) to y (exclusive) years e.g 0-1 refers to below one year of age.

Step 2: Selecting a reference group.

98. In theory, an infinite number of food bundles/baskets or many combinations of foods can provide the selected calorific threshold. However, it is most relevant to construct a food basket based on the actual consumption patterns of the poor in each country. At one extreme, the whole population could be used as the reference group, but this would result in an enormous variance in the basket structure. Therefore, a smaller subgroup is usually selected to correspond to those families whose nutritional consumption is in the vicinity of the minimum threshold. Hence, the need for a reference group.

99. **Reference group/population:** The reference population is the group that provides information on consumption patterns and prices used in costing basic needs for use in the construction of the poverty line. The reference group represents a group of households whose expenditure patterns provide an adequate description of what is required to escape poverty in the given country context. Thus, it should typically include

households that are neither among the poorest nor the wealthiest in a country, ideally reflecting the needs of those who are ‘around’ the existing poverty level. Including the bottom decile or sometimes the bottom quintile in the reference group is tricky as the tail has a lot more noise than the lower middle of the distribution (Fatima and Yoshida, 2018). It is best to choose a reference group that is around the poverty line, reducing sensitivity to measurement error in extreme values (ibid).

Table 11: Current reference groups used in the determination of food baskets in Partner States

	Partner State	Reference group
1	Burundi	4th -7th decile is the threshold used as the reference group.
2	Kenya	Households located in the 30th to 50th percentiles of the rural and the 10th to 30th percentiles of the urban price-adjusted weighted food consumption distributions represent the optimal bandwidth for computing the respective food poverty lines.
3	Rwanda	The preceding poverty headcount ratio before the 2014 survey when the poverty line was revised was 44.9 percent (2010/11), thus the goods included in the basket were those consumed by households whose per adult equivalent consumption was at the bottom 40 percent of the national distribution.
4	South Sudan	Bottom 60% of the population, ranked in terms of real per capita consumption
5	Uganda	The reference population is the poorest 50 percent ranked by consumption per adult equivalent (as per the 1993 survey data). Using mean quantities of different food items consumed by the poorest 50 percent the caloric value of the basket is estimated and then the quantity of food in the basket was scaled up so that it provided exactly 3,000 calories per day.
6	URT-Mainland	The monetary value of minimum food bundle or basket containing 2,200 kilocalories per adult per day for one month, based on the food consumed by 10 to 50 percent of the population.
	URT-Zanzibar	The second, third, fourth and fifth population deciles of the per adult equivalent consumption are used as the reference population for setting up the minimum food basket.

Source: Poverty reports from NSOs

Recommendation 36: Although the choice of the reference population for the minimum food basket is a normative judgment in the construction of a poverty line, it should:

- Correspond approximately to the population of households near the poverty line.
- Reflect food consumption that is near the poverty line.
- Reflect a minimum food basket that is not too poor and not overly rich.

Step 3: Contents and cost of the food basket

100. To determine the cost of the food basket, two different procedures can be identified. Constructing an explicit food basket and then pricing it **or** estimating the cost of the food basket without listing its contents. The first procedure is the one employed across all the EAC Partner States. In this case, an average food basket (i.e., the quantities of different products) is assembled for the reference group.

101. **Constructing an explicit food basket:** Some countries use the basket with its original number of products, while others select the most representative items for each food

category and then adjust their quantities according to the reference group's consumption structure. Since the desired objective is to obtain a minimum basket, it may be necessary to replace rarely consumed or extremely costly goods with more common, less expensive items within the same category. Food consumed in restaurants requires special attention and may eventually be replaced because it may not be possible to get the exact calories of food items consumed. In summary, the basket should be representative of the food consumption of the majority of households in the reference group.

102. Converting food basket into calories: Using caloric conversion factors, the food basket is converted into calories. Computing the nutritional content of each food item in the food basket requires conversion tables produced in each country or, when these are not available, more general tables for use in Africa, developed by specialised agencies such as the FAO. After the caloric intake is estimated, the value of the food bundle needs to be scaled proportionately to achieve the pre-determined caloric threshold.

103. Cost of the food basket: Once the content of the basket has been established, it has to be valued. The cost of buying the pre-determined caloric thresholds is derived from the food consumption patterns prevailing in a reference population. Where market prices are collected alongside the survey, they should be used. Alternatively, when the survey that was used to build the basket contains information on both quantities and expenditures, the implicit median unit values may be used to cost each item in the basket. The resulting product of the whole process is a detailed food basket that specifies quantities of each food item, their total cost and the final cost per calorie. This information is used to obtain the food poverty line.

Recommendation 37: To determine the cost of the food basket – construct an explicit food basket using caloric conversion factors, convert the food basket into calories and then price it. The basket should be representative of the food consumption of the majority of households in the reference group.

5.2 Non-food poverty line

104. Non-food poverty line: Having set the food poverty line, the next step is to estimate an allowance for basic non-food goods to obtain the total/overall poverty line which is used to determine the proportion of the population that is unable to meet the minimum overall basic consumption needs (i.e., the absolute poor). Although food energy requirements are the obvious anchor for food consumption, there is no similar basis for setting basic non-food consumption. All Partner States estimate the non-poverty line through an indirect estimation.

Recommendation 38: Use an indirect estimation of the non-food expenditure poverty line without itemising non-food requirements.

105. Reference population for non-food poverty line estimation: The provision for non-food needs is guided by the expenditure patterns of households for which the average

food expenditure is equal or close to the food poverty line. Under this option, lower and upper bounds are calculated for the non-food poverty line, as explained in Ravallion (1998). The lower bound is given by the expenditure on non-food items of households with total expenditure approximately equal to the food poverty line. The upper bound is given by the expenditure in non-food items of households with food expenditure approximately equal to the food poverty line. Box 7 provides a summary of current practices within the region.

Box 7: Reference populations for non-food poverty line in Partner States

Uganda: Households whose total expenditure is just equal to the food poverty line (lower bound).

Rwanda: Households whose food consumption is within (plus or minus) 10 percent of the food requirement (upper bound). The share of food expenditure is used to gross up the food poverty line to establish the total (cost of basic needs) poverty line. The inverse of this food share is used to inflate food poverty line to account for basic needs poverty line.

Kenya: Uses an iterative process starting with the computation of the mean value of total non-food consumption by households whose food expenditure falls within a one percentage point interval around the food poverty line (upper bound). This process is repeated ten times and at each stage, the interval is increased by additional percentage points.

Tanzania mainland: Non-food component based on the average budget share spent on non-food items amongst households whose total consumption (lower bound) lies within the following interval [food poverty line; 1.2*food poverty line].

Burundi: The amount of non-food expenditure by households whose total expenditure is equal to the food poverty line is determined as an estimate of basic non-food expenditure (lower bound).

South Sudan: Uses an iterative process starting with the computation of the mean value of total non-food consumption by households whose food expenditure falls within a one percentage point interval around the food poverty line (upper bound). This process is repeated ten times and at each stage, the interval is increased by additional percentage points

Recommendation 39: For the non-food poverty line, it is recommended that analysts use the upper bound (Ravallion 1998). This implies using the reference population as households whose food consumption is within (plus or minus) 10 percent of the food poverty line.

106. Derivation of total poverty line: The food poverty line constitutes the foundation on which to anchor the computation of the overall poverty line. The rationale for this is the hierarchy of basic needs which begins with survival food needs followed by basic non-food needs. To estimate the total poverty line, the share of total consumption that goes to food consumption is calculated for the aforementioned reference group. This share is

the “allowance” for non-food consumption that is added to the value of the food poverty line to get the complete poverty line. Box 8 highlights the current practice within the Partner States.

Box 8: Estimation of non-food poverty line across Partner States

Rwanda: Uses the inverse of the food share to inflate food poverty line to account for the basic needs poverty line (food poverty line divided by food share in total poverty line).

United Republic of Tanzania: Uses the inverse of the food share to inflate food poverty line to account for the basic needs poverty line (food poverty line divided by food share in total poverty line).

Uganda: Identifies non-food requirements as the non-food expenditure of those whose total expenditure is just equal to the food poverty line. This is estimated using regression analysis for different regions to allow different locations (Central urban, Northern rural etc) to have different non-food requirements.

Burundi: Using the non-parametric method (Ravallion). This implies getting the average total per adult equivalent consumption for households whose food consumption is +/- 1% from the food poverty line and repeat for households around +/- 2% and so on until +/- 10%.

Kenya: Uses a non-parametric approach and estimates the average non-food expenditure for the population whose food expenditure lies within 1% of the food poverty line. The same exercise is repeated for the population within plus and minus 3%, 4% up to 10%. The average of the mean total non-food expenditures from the ten iterative stages provides a weighted non-parametric estimate of the value of the non-food component.

South Sudan: Uses a non-parametric approach and estimates the average non-food expenditure for the population whose food expenditure lies within 1 percent of the food poverty line. The same exercise is repeated for the population within plus and minus 3 percent, 4 percent up to 10 percent. The average of the mean total non-food expenditures from the ten iterative stages provides a weighted non-parametric estimate of the value of the non-food component.

Source: Poverty reports from NSOs

Literature suggests various ways to determine the average non-food consumption of the reference group. One is to use an econometric technique to estimate the Engel curve (relationship between food spending and total expenditure). We propose using a non-parametric calculation suggested in Ravallion 2008 (currently used in Kenya and South Sudan). The advantage of this method is that no assumptions are made about the functional form of the Engel curve and that weights decline linearly around the food poverty line; meaning the closer the household is to the food poverty line, the higher its assigned weight. This approach provides an upper bound to the overall poverty line and therefore insures against underestimating the incidence of poverty. The detailed computation process is presented in box below.

Box 9: Process of computing non-food consumption using parametric approach.

Estimate the average non-food consumption of the reference group using a non-parametric and upper bound approach as detailed below.

- Select a group of households whose **food expenditure is equal (or close) to the food poverty line**. Estimate the average non-food consumption for this group of households
- **This process is repeated** for households whose food consumption is + or - 1% from the food poverty line and then for those around +/- 2% and so on until +/- 10%.
- Finally, we take the **average of all these averages and derive the non-food component** of the poverty line.

107. In conclusion, poverty is then estimated by comparing actual expenditures to the total poverty line/CBN. A person is deemed not poor if his/her actual expenditures is above the poverty line even if he/she consumes less food than the stipulated bundle by re-arranging his/her budget allocation. This helps in avoiding any possible disagreements that might arise when choosing the basket more normatively (Ravallion 1998).

5.3 Validity of poverty lines

108. Updating the poverty line: Once the poverty line is established, it is important to update it over time (with new survey data). Poverty lines can be adjusted either by keeping the quantities of the baskets fixed and updating their market prices or by setting up new baskets. Since baskets are anchored on consumption habits, how often the basket should be modified depends not only on data availability but also on the significance of changes in consumption patterns.

This raises the important question of how frequently an absolute poverty line should be updated. Here the trade-offs are clear: the threshold should be fixed long enough to be able to discern underlying changes in poverty; and it must be updated often enough so that the standard is reasonably consistent with prevailing circumstances. Absolute poverty lines are often held constant over a long period, and then updated to reflect changing living standards.

Recommendation 40: Once the poverty line is established, it is important to update it over time. The threshold should be fixed long enough to be able to discern underlying changes in poverty; and it must be updated often enough to remain reasonably consistent with prevailing circumstances.

6. POVERTY INDICATORS

109. Aggregation: Having decided on a welfare measure (consumption per adult equivalent) and established a poverty line, the next stage is the selection of indicators useful for tackling poverty. Indicators may be used to highlight the level of poverty in different countries or areas, the depth of poverty that people experience, and how poverty is changing over time.

Given a welfare measure and a poverty line, it is possible to identify who is poor and who is not. The final issue in measuring poverty is to aggregate this information to obtain a single poverty statistic for a country. This is an example of an “index number problem”, in that we must reduce a vector – poverty status of millions of people – to a single scalar value. A typical class of poverty measures is the Foster, Greer and Thorbecke (usually referred to as FGT) indexes (headcount, poverty gap, and squared poverty gap).

110. Headcount ratio (H): The most commonly used measure is the headcount ratio, which describes the proportion of the population that is living in households whose consumption expenditure is less than the poverty line. It is popular because it is easy to both understand and measure, allowing users to easily understand the scale of poverty amongst different groups. This can be expressed as:

$$H = \frac{q}{n}$$

q = number of people deemed poor; n = population size

Recommendation 41: The poverty incidence or headcount ratio is recommended as the primary indicator due to its widespread acceptance in policy and ease of comprehension. It is recommended that all Partner States report the headcount ratio.

111. Limitations of headcount ratio: Despite its strengths and ubiquity, the headcount ratio has a number of limitations. First, while it describes the number of people who are in poverty, it does not reflect the depth of poverty that people experience. It is based on a binary measure of poverty and no distinction is made between those who are just below the poverty line and those who are significantly below. It provides a very limited view of poverty, since it offers no information on “how poor the poor are”. One implication of this is that if poor individuals become less poor (but are still below the poverty line), there will be no change in the indicator. Similarly, if the depth of peoples’ poverty increases, the indicator will also remain unaffected. To address the challenges of the headcount index, other indices like Poverty Gap Index and Severity of Poverty Index should be reported.

112. Poverty gap index: The poverty gap index (P1) measures the extent to which individuals fall below the poverty line (the poverty gaps) as a percentage of the poverty line. The sum of these poverty gaps gives the minimum cost of eliminating poverty if it was somehow possible to perfectly target social transfers.

Recommendation 42: All Partner States should report the poverty gap index. This should be supplemented by the total poverty gap in currency terms (multiplying by the total population and by the poverty line).

The total poverty gap in currency terms is seen as the minimum of the amount required to deal with extreme poverty, provides a graphic guide to the scale of the resources necessary to tackle global poverty. It is worth noting that this measure does not reflect changes in inequality among the poor.

If you multiply a country's poverty gap index by both the poverty line and the total number of individuals in the country, you get the total amount of money needed to bring the poor in the population out of extreme poverty and up to the poverty line, assuming perfect targeting of social interventions

113. Squared poverty gap/severity of poverty: The squared poverty gap index averages the squares of the poverty gaps relative to the poverty line. This implicitly puts more weight on observations that are well below the poverty line, thereby accounting for inequality amongst the poor. However, the squaring of the poverty gaps means that it is less easy to interpret than the standard poverty gap index. It is one of a class of poverty measures proposed by Foster, Greer and Thorbecke (1984) which vary the weight of the income (or expenditure) level of the poorest members in society.

Recommendation 43: All Partner States should compute and report the severity of poverty.

114. Disaggregation/profiling: A country poverty profile sets out the major facts on poverty (and inequality), and then examines the pattern of poverty, to see how it varies by geography (by region, urban/rural etc.), by community characteristics (e.g., in communities with and without a school, etc.), and by household characteristics (e.g., by education of household head, by household size, etc.). Hence, a poverty profile is simply a comprehensive poverty comparison, showing how poverty varies across subgroups of society, such as region of residence or sector of employment. This is a key aspect of Agenda 2030's aspiration "to leave no one behind". A well-presented poverty profile can be immensely informative and extremely useful in assessing how the sectoral or regional pattern of economic change is likely to affect aggregate poverty, even though it uses rather basic techniques such as tables and graphs. Profiles can also help answer a wide range of questions such as:

- i. Who are the poor?
- ii. Where do they live?
- iii. What do they do?
- iv. What sectors are they most dependent on for their livelihoods?
- v. Do they have access to economic infrastructure and support services such as social services and safety nets?

Recommendation 44: All Partner States should disaggregate all major poverty indicators as much as possible. At the minimum, poverty statistics should be disaggregated by:

- geography (rural/urban; first administrative level in the partner state e.g., region, county etc);
- household characteristics e.g., by education of household head, sex of household head, employment status, among others;
- contribution to national poverty by different geographical/administrative areas

115. Dynamic Measures: It is widely acknowledged that experiencing poverty over a number of years is more detrimental for the individual than a brief period in poverty. Another important application of longitudinal data is the examination of transitions into and out of poverty from one year to the next. Analysing poverty trends can provide an important addition to the information that is provided by static measures. Dynamic measures of poverty are a valuable tool in developing and targeting policy effectively. Although no dynamic indicators are currently proposed for the EAC region overall due to the limited availability of suitable longitudinal data (except for Rwanda, Uganda, and Tanzania), NSOs should consider opportunities for producing longitudinal data in order to be able to produce comparable dynamic poverty indicators in the future.

Inequality Measures

116. Inequality: The focus of this guide is on poverty, which looks at the situation of individuals or households who find themselves at the bottom of the consumption expenditure distribution. However, sometimes we are interested in measuring inequality too and for that reason we have included a few guidelines on measuring inequality. Inequality is a broader concept than poverty in that it is defined over the entire population and does not only focus on the poor.

117. Gini coefficient of inequality: The most widely used single measure of inequality is the Gini coefficient. It is based on the Lorenz curve, a cumulative frequency curve that compares the distribution of a specific variable (e.g., expenditure or income) with the uniform distribution that represents equality. We therefore recommend a continuation in use of Gini coefficient as the main inequality measure. Other complementary indicators that may be computed include the Palma ratio. The Palma ratio is the ratio of national consumption share of the richest 10 percent of the population to that of the bottom 40 percent. Partner States are encouraged to compute and report the Palma ratio as a measure of inequality.

Recommendation 45: All Partner States should compute and report the Gini coefficient since it is the most widely used single measure of inequality.

118. It is worth noting that the Gini index is not easily decomposable or additive across groups. That is, the total Gini of society is not equal to the sum of the Gini coefficients of its subgroups. In the context of additive decomposability, the Generalised Entropy class of inequality indexes are a good alternative to the Gini Index. Unlike the Gini Index, the members of this class are perfectly decomposable without a residual term. Therefore,

member states are encouraged to calculate the Generalised Entropy class of indices to allow for the sub-group additive decomposition of inequality.

119. Complementary poverty indicators: Conventionally, poverty has been measured by focusing on income and consumption. However, studies have shown that purchase behaviour is just one part of the defining characteristic of poverty. There is now global recognition, even within the sustainable development goals framework, of the need to have a comprehensive poverty measure that captures multiple deprivations faced by the poor. Some countries (e.g., Rwanda and Uganda) are already computing National Multidimensional Poverty Indices (MPIs) to complement their official monetary poverty measure. As we move towards having harmonised poverty statistics within the region, there is a need to compute comparable non-monetary indicators of poverty. It is recommended that a separate set of guidelines are produced for non-monetary poverty measures.

120. Sensitivity analysis: The process of constructing a consumption aggregate and estimating inequality and poverty is riddled with methodological dilemmas. Even when sticking by the recommendations from the theory and literature, rarely does the analyst have a singular clear path towards the end result. In practice, compromises have to be made, and difficult choices have to be made between several valid options. For instance, there is typically more than one viable imputation strategy for missing or extreme values. Even more often, the analyst will be faced with the need to pick one of a few “bad” alternatives – is it better to include an unreliable self-reported rental value in the aggregate? Or one that is modelled, even though we may know the model may not be very good? Should we construct a spatial price index based on “noisy” survey-based unit values, or should we skip spatial deflation altogether?

Sometimes there simply is no consensus in the literature on the best course of action: the choice of the equivalence scale that is most appropriate for adjusting the consumption aggregate is a notable example (Mancini and Vecchi, 2022). Good practice requires that the analyst provide an evaluation, possibly a quantification, of the impact of arbitrary choices on final estimates. This can be accomplished through sensitivity analysis, which may be defined loosely as the study of how changes in the inputs of a process affect its output. Simply put, the goal of sensitivity analysis is to test whether results are robust to the assumptions made by the analyst.

Recommendation 46: A section or appendix dedicated to systematic sensitivity testing should become the norm for any technical report presenting inequality and poverty estimates.

Some of the candidates for sensitivity analysis include the choice of equivalence scales, inclusion of an expenditure component that is “atypical” or measured with error, which they indicate as top candidates for sensitivity analysis

7. PUBLICATION AND DISSEMINATION

121. Poverty statistics are not self-explanatory. It is therefore inevitable that releases of poverty estimates are accompanied by appropriate documentation related to the associated definitions, terminology, methodology and quality indicators, to help with the interpretation of the data.

122. Metadata: A review of current practices in the NSOs has revealed that metadata are often missing, hard to find or incomplete. In some cases, the exact or even broad definitions are missing, and in several cases, the detailed methodology is not clearly specified. Publishing poverty statistics without any further specification makes comparative analysis difficult.

Maintenance of good metadata is important for cross-country comparability of poverty estimates. It helps users understand the extent to which data are comparable across countries and over time. This is particularly the case where indicators are based on national poverty lines, which allows for considerable variation between countries.

Recommendation 47: Releases of poverty estimates should be accompanied by appropriate documentation related to the associated definitions, terminology, methodology and quality indicators (e.g., coefficient of variation, sampling errors, sample design etc.) to help with the interpretation of the data.

For monetary poverty indicators across the region, it is recommended that the following minimum set of metadata be made available, in order to assist users in making sensible comparisons both between countries and within countries over time.

Conceptual metadata

- i. Unit of observation (e.g., household)
- ii. Unit of analysis (e.g., individual)
- iii. Survey population, who is included and who is excluded.
- iv. Definition of welfare measure, including information on any deviation from main international and regional standards and other key variables
- v. Equivalence scale used.
- vi. Type of poverty line: Absolute or relative
- vii. Methodology for calculating poverty line.
- viii. Reference period: Period of time or point in time to which the measured observation refers
- ix. Unit of measure: Unit in which the data values are measured (e.g., headcount ratio, percentage of population).

Basic Information Data

- I. Source data: whether data are taken from a sample survey, census or a combination of sources. If the data are from a combination of sources, a description of how the data from multiple sources were used to produce the estimates being disseminated are provided.
- II. Sample size and design

- III. Subject matter or content of the data source- a general description of the content areas and modules, and a link to the questionnaires used, among others
- IV. Data provider: Organisation that produced the data. Contact information: Individual or organisational focal points for the data, including information on how to reach them (e.g., website, mail address, phone, e-mail).

Quality metadata

- I. Accuracy: Closeness of computations or estimates to the exact or true values that the statistics are intended to measure. This includes bias (systematic error) and variance (random error). This may be described in terms of major sources of error (e.g., coverage, sampling, non-response) or measures of accuracy.
- II. Timeliness
- III. Comparability: Explanations should be provided where differences between statistics can be attributed to differences between the true values of statistical characteristics. Comparability issues can be broken down into:
 - IV. Geographic differences: degrees of comparability between statistics measuring the same phenomenon for different geographical areas;
 - V. Temporal differences: degree of comparability between two or more instances of data on the same phenomenon measured at different points in time.
- VI. Periodicity: e.g., annual, every five years, etc.

Source: Adopted from a Guide to Poverty Measurement by United Nations Economic Commission for Europe (2017).

123. Timeliness: Even where data have been frequently collected, processing lags tend to be lengthy. The time span between fieldwork and the end of the reference period should be kept as short as possible to avoid delays and ensure consistency of information on household composition and the consumption reference period. However, there may be a trade-off between accuracy and timeliness if time allowed for certification of data is reduced and caution must be exercised prior to implementing proposals for increasing timeliness of the data. To improve timeliness of poverty statistics, we recommend that products associated with the release of data are disseminated in waves so as not to delay the initial dissemination of survey results. Also, timeliness can be improved throughout the collection, processing and dissemination steps if operations, which are independent of each other, are undertaken in parallel instead of sequentially.

Recommendation 48: The time from the last day of fieldwork to the release of a poverty report should not be more 9 months. A key indicators report should be released within 6 months after field work.

124. Report: The main statistical report should contain basic tables and aggregates. It should include a summary presentation of the methodology used, including basic concepts and definitions, the sample and survey design as well as details on data collection and data processing. An assessment of the quality of the data, sampling and non-sampling errors, non-response rates and any other major issues relating to the statistics should also be provided. An indication of the extent of and the method used for the imputations should also be made available when the statistics are published, and imputed values should be identified when micro-datasets are distributed. A separate technical or basic report with detailed information should be prepared to complement the main report.

Recommendation 49: The main statistical report should provide a snapshot of the methodology used (sample and sample design, data collection and processing, detailed methodology used in poverty estimation).

Provide details on the quality of the data (sampling and non-sampling errors, non-response rates) and any other major issues relating to the statistics should also be provided. Provide details of imputations made and imputed values should be identified when micro data sets are distributed.

A separate technical or basic report with detailed information should be prepared to complement the main report.

125. Availability of microdata: Data is of no value if it is not properly documented and shared. Releasing microdata in a timely manner allows researchers and policymakers to replicate officially published results, generate new insights into issues, avoid survey duplication, and provide greater returns to the investment in the survey process. This will ensure effective utilisation of the data, stimulate more in-depth study, and encourage dialogue and feedback between the data producers and users. To ensure microdata is used and appropriately preserved for institutional knowledge retention, it must be well-documented and include detailed metadata.

126. Anonymisation: When releasing microdata, the privacy of respondents is paramount. All identifying information must be removed from any datasets that will be shared publicly, including names, addresses, phone numbers, GPS coordinates (unless anonymised), and so on. The level and methods of anonymisation depend on the sensitivity of the data as well as the access policy and terms of use.

Recommendation 50: Without breaching the confidentiality of information collected, public use files (anonymised micro-datasets) should be made available to analysts and other interested users. Access conditions and data terms of use should be clearly documented.

127. Wide dissemination of poverty statistics: In addition to the dissemination of the statistical report and possible distribution of public-use files, the main results from the survey should be publicised through conferences, seminars, the media (interviews, popular articles and press releases), etc. In addition to the statistical report, it is recommended that a popular version is produced. In collaboration with academia and research institutes, focused in-depth reports and analytical papers should be produced for policymakers.

8. SUMMARY OF RECOMMENDATIONS

This chapter provides a summary of the recommendations for improving the regional comparability of monetary poverty statistics, including their publication and dissemination.

1. Data Collection and Questionnaire Design

Recommendation 1: Given their representativeness and objectivity, it is recommended that NSOs continue using household surveys as the major source of data for estimating official poverty statistics.

Recommendation 2: All poverty statistics within the EAC countries are computed based on private households. For comparability at regional level, it is recommended that NSOs continue covering private households.

Recommendation 3: Countries should implement survey designs whose resulting estimates are representative **at least** at rural/urban and the first administrative level in each country. Where possible, sampling designs should allow for estimates at lower administrative levels. Similarly, NSOs may use other approaches such as small area estimation methodologies to estimate poverty at lower administrative units.

Recommendation 4: Surveys used for poverty measurement should be conducted frequently so that countries can act based on relevant and timely information. To increase the frequency of poverty statistics and narrow the gap among Partner States, it is proposed that national household surveys for poverty measurement are conducted at least every 3-5 years.

Recommendation 5: The unit of observation for consumption expenditure should typically be the household, while the unit of analysis of poverty should ideally be the individual.

Recommendation 6: Data collection for poverty measurement surveys should spread over 12 months of fieldwork in order to capture seasonal variation in food consumption and expenditure patterns. In addition, as much as possible, enumeration should be equally spread throughout the days of the week and the month.

Recommendation 7: NSOs should continue using Computer Assisted Personal Interviewing (CAPI) and related modern technologies to reduce time and cost and, minimise errors in data processing.

Recommendation 8: It is recommended that Partner States consider implementing recall interviews with a 7-day recall period for collection of food consumption data, as this method provides a good balance between accuracy and cost-effectiveness.

In the transition process, any change in recall period or data collection method (diary vs. recall) should be accompanied by an experimental component aimed at assessing the change in survey estimates. The experiment helps to disentangle the extent to which the change in measured poverty is real and how much was caused by the change in data collection method.

Recommendation 9: Partner States should always collect data on all modes of acquisition: purchase, own production, in-kind/gift receipts.

Recommendation 10: To ensure comprehensiveness of food items:

- I. It is recommended that survey designers use the COICOP classification system for purposes of collecting consumption data. Food items from all the food classes

should be present as per the COICOP classification. Partner States are implored to compile a matrix of product availability and importance using the existing items in the COICOP classification as a guide. Only items that are available in the country and are considered important in the country can then be included in the food list. Frequency and importance of each food item's dietary and expenditure patterns can be drawn from previous household surveys or dietary survey data carried out in a given country.

- II. The list needs to include a reasonable number of individual items (the most common ones) for each of the main food classes. A residual/ "other" category should be added when relevant (e.g., "other fruits" or "other vegetables") to record the acquisition or consumption of additional food items. Such categories should remain marginal as quantities cannot be collected under those categories and food matching is imperfect.
- III. Food items that are the object of product-specific government subsidised programs should be listed individually on the food list; and
- IV. Foods that are fortified or have the potential to be the vehicle of food fortification programs (e.g., iodised salt, fortified flour or cooking oil) should be listed individually in the food list.

Recommendation 11: Surveys should be designed so that the distinction between acquisition and consumption is clear. Use of filter questions on consumption to rule out acquisition (and vice versa should be avoided).

Recommendation 12: To improve the accuracy of food consumption estimates, surveys should allow respondents to report in both standard and non-standard units, according to what they are most familiar with for each reported item.

Recommendation 13: To ensure availability of valid conversion factors for the reported Non-standard units (NSUs), a specialised market survey for the production of conversion factors for non-standard quantity units should be conducted prior to the household survey. In countries where libraries of NSUs and conversion factors exist, they should be continually updated with new NSUs and conversion factors. In addition, photo reference guides of the most common NSUs should be prepared and used (shown to respondents during the household survey to help standardise the NSUs).

Recommendation 14: For all purchased food items, the survey should contain information on the value/expenditure and quantity. Information on expenditure alone does not allow for a price/unit value check.

To deal with issues related to use of unit values, a price survey should be conducted at the time of household survey data collection. This will enable survey teams to collect the price levels faced by respondents for either all or frequently consumed basket of goods.

Recommendation 15: Food away from home warrants the design of a separate module based on a clear definition of 'food away from home'. Data collection should be organised around meal events – including snacks and drinks – and surveys should use the same reference period for food away from home as the one used for the food consumed at home module.

Recommendation 16: Data on non-food goods and durables should ideally be collected through the recall approach since they are not daily (frequent) expenditures. Just like for food items, we recommend the use of COICOP classification for non-food goods.

Since the COICOP list may be too extensive resulting in both interviewer and respondent burden, Partner States are implored to compile a matrix of availability and importance using the existing items in the COICOP classification as a guide. Items that are available and important in the country can then be included in the list of non-durable and durable goods. All major COICOP classes should be covered.

Recommendation 17: Use different recall periods, for example over the past 7 days, 1 month, the past 6 months, or the past 12 months, depending on how frequently the items concerned are typically purchased.

Recommendation 18: Unit non-response: The best way to mitigate unit non-response is to prevent it from happening by maximising compliance ex ante, that is at the survey implementation stage. In the case where ex post adjustments become necessary, the involvement of a sampling specialist is advised. It is recommended that the documentation accompanying the final estimates explicitly address unit non-response and how expansion factors (weights) were handled.

Recommendation 19: Item non-response: Always assess the extent to which item non-response affects the consumption aggregate through its elementary components. If the incidence of missing data is a concern, the nature of missingness should be investigated.

If data are missing at random (MCAR and MAR), a number of approaches are available to mitigate the impact of missing values on the statistics of interest. In both cases (random and non-random item non-response), the recommendation is to report how any corrections were handled in the documentation accompanying the final estimates. If there is evidence that data are missing not at random (MNAR), the problem is more serious and requires developing ad hoc imputation models.

Recommendation 20: Extreme values represent a potential threat to the unbiasedness of consumption statistics, poverty, and inequality estimates. It is essential to check the variable(s) of interest and assess the incidence of outliers before producing final estimates. In addition, it's important to conduct sensitivity analysis, e.g., by comparing results obtained for key indicators with and without the inclusion of outliers.

Irrespective of the method used in terms of outlier detection and treatment, careful documentation of their treatment/what was done, would be a step forward in the direction of comparability and transparency of final estimates.

2. Construction of the Nominal Consumption Aggregate

Recommendation 21: For measurement of monetary poverty across the EAC, it is recommended that consumption expenditure be the main welfare measure, given its widespread usage among the Partner States and its advantages as spelt out in the literature.

Recommendation 22: The food consumption aggregate should include:

- I. Food consumed from purchases.
- II. Food consumed from home-production (own production).
- III. Value of food that is consumed out of the home (amount spent in restaurants, prepared foods, meals at school, work, vacations etc.)
- IV. Food consumed from items received as gifts, in-kind or remittances from other households.

Recommendation 23: The use/consumption approach (the value of food consumed) closely equates to consumption and should be the one included in the food aggregate. This is because it is the use of food not it's mere acquisition, that contributes to well-being.

Recommendation 24: If the food consumed was produced by the households or received from elsewhere as gifts or in kind, the market value of the food items should be included as consumption expenditure.

Unit values may then be used to price the quantities of food items that were own produced or received in kind. The use of median or mean price (subject to checks that such prices are plausible) paid by households within the cluster/primary sampling unit is recommended. Otherwise, the analyst moves up to the next administrative level and computes median/mean unit values in the same subregion or a higher level if not available.

Since unit values are usually affected by quality bias, countries are implored to undertake price surveys alongside the household survey and use these prices for the valuation of own production and goods received in kind.

Recommendation 25: All goods and services with a YES in COICOP classification table below should be included in the Nominal Consumption Aggregate.

COICOP	Description	Inclusion in NCA
1.1	Food	Y
1.2	Non-alcoholic beverages	Y
1.3	Services for food and non-alcoholic processing	N
2.1	Alcoholic beverages	Y
2.2	Alcohol production services	N
2.3	Tobacco	Y
2.4	Narcotics	Y*
3.1	Clothing	Y
3.2	Footwear	Y
4.1	Actual rentals for housing	Y
4.2	Imputed rentals for housing	Y
4.3	Maintenance, repair and security of the dwelling	S
4.4	Water supply and other services relating to the dwelling	Y
4.5	Electricity, gas and other fuels	Y
5.1	Furniture, furnishings, and loose carpets	Y
5.2	Household textiles	Y
5.3	Household appliances	S
5.4	Glassware, tableware and household utensils	Y
5.5	Tools and equipment for house and garden	Y
5.5	Goods and services for routine household maintenance	Y
6.1	Medicines and health products	Y
6.2	Outpatient care services	Y
6.3	Inpatient care services	Y
6.4	Other health services	Y
7.1	Purchase of vehicles	N
7.2	Operation of personal transport equipment	Y
7.3	Passenger transport services	Y
7.4	Transport services of goods	Y
8.1	Information and communication equipment	S
8.2	Software	Y
8.3	Information and communication services	Y
9.1	Recreation durables	N
9.2	Other recreational goods	S
9.3	Gardens and pets	Y
9.4	Recreational services	Y
9.5	Cultural goods	S
9.6	Cultural services	Y
9.7	Newspapers, books and stationery	Y

9.8	Package holidays	Y
10.1	Early childhood and primary education	Y
10.2	Secondary education	Y
10.3	Post-secondary non-tertiary education	Y
10.4	Tertiary education	Y
10.5	Education not defined by level	Y
11.1	Food and beverage serving services	Y
11.2	Accommodation services	Y
12.1	Insurance	Y
12.2	Financial services	N
13.1	Personal care	Y
13.2	Personal effects n.e.c.	S
13.3	Social protection	Y
13.9	Other services n.e.c	S

NOTE: Y = Yes, include in the NCA; N = No, exclude from the NCA; S = Some of the items in this category are to be included, some are not; n.e.c. = not elsewhere classified.

Recommendation 26: Health expenditures should be included. However, lumpy/infrequent health expenditure should be excluded.

Recommendation 27: The construction of the non-food/non-durable aggregate should **exclude** certain items.

- III. Taxes (which are considered a deduction from income and not an expenditure) and current transfers to government.
- IV. Expenditures that are not welfare enhancing such as fines
- V. Capital transactions such as purchases of financial assets, debt/loan and interest rate payments.
- VI. Lumpy and infrequent/occasional expenditures such as marriages, dowries and funerals.
- VII. Remittances given to other households. The rationale for this is to avoid double counting because most likely these transfers are already reflected in the consumption of the recipients.

Recommendation 28: Estimate the consumption flow from all the owned consumer durables based on the user cost method and estimate the depreciation parameter using the geometric model (assumes the depreciation rate to be constant over time). If the information required by the geometric model is not available, use the economic life depreciation model.

Recommendation 29: The consumption aggregate should reflect the monetary value of the service provided by the dwelling to the homeowner that is, actual rent (for renters) or imputed rent for homeowners. The imputations may be checked against self-reported ones.

3. Adjustments to Nominal Consumption Aggregate

Recommendation 30: We recommend estimating a Paasche index at the household level for spatial deflation. For simplicity, we recommend constructing a Paasche price index where each household's bundle of goods and services is evaluated, not at the prices they paid, but at a common set of prices preferably market price survey and unit values. In instances where such surveys are not available, median unit values at PSU level may be used.

Since surveys are carried out over a period of 12 months, it is advisable to also adjust for within-survey inflation by dividing computed nominal consumption aggregates by a monthly temporal price index, according to the interview date of each household.

Recommendation 31: Use equivalence scales to adjust the nominal consumption aggregate. Given their widespread use within the EAC, we recommend equivalence scales

that are based on 2001 FAO/WHO nutritional requirements (calorie needs) of individuals of different ages and sex.

4. Poverty lines

Recommendation 32: Use absolute poverty lines because they allow for transparent comparisons over time where changes in measured poverty can be attributed purely to changes in the distribution rather than to a moving poverty cut-off.

Recommendation 33: In line with most literature, we recommend the approach of Ravallion and Bidani (1994) which focuses on defining food-related needs and only indirectly estimates non-food requirements.

Recommendation 34: Use the semi-normative food poverty line in which the food poverty line represents the minimum cost of attaining nutritional requirements while simultaneously respecting observed consumption patterns and habits.

Recommendation 35: Based on the caloric requirements established for different types of persons (as per WHO/FAO/UNU 2001 standards), a weighted average of the caloric requirements for the whole population should be computed, taking into account the structure of the population. This then results in an average caloric requirement per person.

Recommendation 36: Although the choice of the reference population for the minimum food basket is a normative judgment in the construction of a poverty line, it should:

- I. Correspond approximately to the population of households near the poverty line,
- II. reflect food consumption that is near the poverty line,
- III. reflect a minimum food basket that is not too poor and not overly rich.

Recommendation 37: To determine the cost of the food basket, construct an explicit food basket using caloric conversion factors, convert the food basket into calories and then price it. The basket should be representative of the food consumption of the majority of households in the reference group.

Recommendation 38: Use an indirect estimation of the non-food expenditure poverty line without itemising non-food requirements.

Recommendation 39: For the non-food poverty line, it is recommended that analysts use the upper bound. This implies using the reference population as households whose food consumption is within (plus or minus) 10% of the food poverty line.

Recommendation 40: Once poverty line is established, it is important to update it over time. The threshold should be fixed long enough to be able to discern underlying changes in poverty; and it must be updated often enough so that the standard is reasonably consistent with prevailing circumstances.

5. Poverty and inequality Indicators

Recommendation 41: The poverty incidence or headcount ratio is recommended as the primary indicator due to its widespread acceptance in policy and ease of comprehension. It is recommended that all Partner States report the headcount ratio.

Recommendation 42: All Partner States should report the poverty gap index. This should be supplemented by the total poverty gap in currency terms (multiplying by the total population and by the poverty line).

Recommendation 43: All Partner States should compute and report the severity of poverty.

Recommendation 44: All Partner States should disaggregate all major poverty indicators as much as possible. At the minimum, poverty statistics should be disaggregated by:

- I. Geography (rural/urban; first administrative level in the partner state e.g., region, county etc);
- II. Household characteristics e.g., by education of household head, sex of household head, employment status, among others
- III. Contribution to national poverty by different geographical/administrative areas

Recommendation 45: All Partner States should compute and report the Gini coefficient since it is the most widely used single measure of inequality.

Recommendation 46: A section or appendix dedicated to systematic sensitivity testing should become the norm for any technical report presenting inequality and poverty estimates. Some of the candidates for sensitivity analysis include the choice of equivalence scales, inclusion of an expenditure component that is “atypical” or measured with error, which they indicate as top candidates for sensitivity analysis.

6. Publication and Dissemination

Recommendation 47: Releases of poverty estimates should be accompanied by appropriate documentation related to the associated definitions, terminology, methodology and quality indicators (e.g., coefficient of variation, sampling errors, sample design etc.) to help with the interpretation of the data.

Recommendation 48: The time from the last day of field work to the release of poverty report should not be more 9 months. A key indicators report should be released within 6 months after field work.

Recommendation 49: The main statistical report should provide:

- I. A snapshot of the methodology used (sample and sample design, data collection and processing, detailed methodology used in poverty estimation).
- II. Provide details on the quality of the data (sampling and non-sampling errors, non-response rates) and any other major issues relating to the statistics should also be provided.
- III. Provide details of imputations made and imputed values should be identified when micro-datasets are distributed.

A separate technical or basic report with detailed information should be prepared to complement the main report.

Recommendation 50: Without breaching the confidentiality of information collected, public use files (anonymised micro datasets) should be made available to analysts and other interested users. Access conditions and data terms of use should be clearly documented.

ANNEXES

Annex 1: Headcount poverty in EAC Partner States

Country	Headcount poverty (%)	Source
Burundi	51.4	Household Survey of Living Conditions in Burundi (2019/20)
Uganda	20.3	Uganda National Household Survey 2019/20
Rwanda	38.2	Integrated Household Living conditions survey (2016/17)
Tanzania ⁹	26.4	Household budget survey (2017/18)
Kenya	36.1	Kenya Integrated Household Budget Survey (2015/16)
South Sudan	50.6	National Baseline Household Survey (2009)
	82	2016- High frequency survey (covers only 6 states)

Source: NSO survey reports

Annex 1b: Summary of key methodological differences in poverty measurement across Partner States

	Differences
Data collection	<ul style="list-style-type: none"> Some countries use recall while others use diary in collecting food consumption data. Differences in recall and reference periods used to collect consumption data
Computation of Nominal Consumption aggregate	<ul style="list-style-type: none"> Some countries exclude rent while others include it Treatment of durable goods is different across Partner States (others include full purchase value, others exclude durables completely, while others compute the consumption flow)
Computation of Real Consumption aggregate	<ul style="list-style-type: none"> Different methods are used to compute price indices for adjusting for spatial and temporal price differences. Equivalence scales used to adjust for differences in household composition are quite different across Partner States. One country uses per capita to adjust for household composition
Poverty lines	<ul style="list-style-type: none"> Energy (caloric) requirements used in setting food poverty line differ. Choice of reference populations differs. Differences in setting non-food poverty lines

⁹ This poverty rate is for Mainland Tanzania. Zanzibar's poverty rate is 25.7% as per 2019/20 HBS

Annex 2: Excerpt from conversion factors for food consumption data, Uganda

Item code	Item	unit code	unit description/size	kgs
101	Matooke-bunch	67	Bunch-Big	43.25
101	Matooke-bunch	68	Bunch-Medium	25
101	Matooke-bunch	69	Bunch-Small	11.5
102	Cluster of Matooke	73	Cluster	2.883
103	Heap of Matooke	64	Heap	1.483
109	Irish potato	20	Debe(20ltrs)	9
109	Irish potato	22	Plastic basin(15ltrs)	11.9
109	Irish potato	29	Kimbo Tin(2kg)	2.2
109	Irish potato	90	Heap	2.2
109	Irish potato	92	Heap-Small	1.4
109	Irish potato	103	Plastic basin(5ltrs)	3.875
109	Irish potato	119	Nomi Tin(1kg)	3.27
109	Irish potato	120	Nomi Tin(0.5kg)	2.05
109	Irish potato	121	Nomi Tin(0.25kg)	1.1
110	Rice	22	Plastic basin(15ltrs)	16
110	Rice	29	Kimbo Tin(2kg)	2.5
110	Rice	30	Kimbo Tin(1kg)	1.3
110	Rice	31	Kimbo Tin(0.5kg)	0.6
110	Rice	32	Cup/Mug(0.5ltrs)	0.45
110	Rice	33	Glass(0.25ltrs)	0.3
110	Rice	77	Jug(2ltrs)	2.1
110	Rice	79	Jug(1t)	1.4
110	Rice	103	Plastic basin(5ltrs)	3.5
110	Rice	104	Glass(0.5ltrs)	0.375
110	Rice	106	Jug(2.5ltrs)	2.3
110	Rice	107	Nice cup-100g(Large)	0.49
110	Rice	108	Nice cup-60g(Medium)	0.425
110	Rice	109	Nice cup-50g(Small)	0.3
135	Onions-big	87	Piece/unit-Medium	0.05
135	Onions-big	88	Piece/unit-Small	0.05
135	Onions-big	64	Heap	0.637
135	Onions-big	97	Bundle-Small	0.25
135	Onions big	103	Plastic basin(5ltrs)	3.175
136	Tomatoes	85	Number	0.155
136	Tomatoes	64	Heap	1.327
147	Sugar	1	Kilogram	1
147	Sugar	2	Gram	0.001
147	Sugar	32	1/2ltr mug	0.5
147	Sugar	34	100g ladle	0.1
147	Sugar	51	1/2kg packet	0.5
147	Sugar	52	250g packet	0.25
147	Sugar	53	100g packet	0.1
147	Sugar	33	Glass(0.25ltrs)	0.3
147	Sugar	35	Table spoon	0.013
147	Sugar	36	Tea spoon	0.006
147	Sugar	104	Glass(0.5ltrs)	0.375
147	Sugar	105	Glass(0.125ltrs)	0.1
124	Eggs	61	Tray of 30eggs	1.65
124	Eggs	85	Piece/Unit	0.05

Source: Extracted from Uganda Bureau of Statistics (UBOS) library of conversion factors

Annex 3: Comparison of different sources of price data

Trait	Household based survey unit values	Market price data	CPI data
Nationally representative	Yes (but potentially biased toward purchasing households)	Yes (but a potentially large number of missing values)	No (often only urban, purposive sampling)
Representative for survey strata	Yes	Yes (but a potentially large number of missing values)	No (data collection delinked from household survey)
Sample size	Yes (large number of observations, especially for diary surveys)	Not really (only few price observations per item and cluster, missing values)	Not really (only limited number of price observations per item)
Coverage of both food and non-food coverage	Mostly collected for food items	Yes (often, only few non-food items)	Yes
Precisely defined items	Generally not, especially recall surveys with an aggregated list	Yes (If enumerators are well instructed)	Yes, (typically well-trained enumerators, every month)
Direct measurement	No (computed as value divided by the quantity)	Yes	Yes
Collection process resembles actual transactions	Yes, based on actual transactions)	No (especially with non-resident enumerators)	No (especially with non-resident enumerators)

Source: Gaddis, 2016

Annex 4: Equivalence scales used in Partner States

Kenya: The Anzagi-bernard equivalence scales are used. These adult equivalence scales prescribe that age groups 0-4 years are weighted as 0.24 of an adult, children aged 5-14 years be weighted as 0.65 and all people aged 15 years and older be assigned a value of unity.

Uganda: Uganda's adult equivalence scale is based partly on calorie requirements. The reference person is an adult male aged between 18 to 30 years. The WHO estimates that a one-year-old boy requires 820 calories per day and while a man (18-30yrs) engaged in subsistence farming requires around 3,000 calories. Hence a one-year-old boy is treated as being equivalent to 0.273 (820/3000) of an adult male

Uganda's equivalence scale

Age	Male (Female)	Equivalence scale
1	820	0.273
1-2	1150	0.380
2-3	1350	0.450
3-5	1550	0.517
5-7	1850	0.617
7-10	2100	0.700
10-12	2200	0.733
12-14	2400	0.800
14-16	2650	0.883
16-18	2850	0.950
18-30	3000	1.000
30-60	2900	0.977
>60	2450	0.845

Source: Appleton et al, 1999

United Republic of Tanzania: They use a scale developed by the World Health Organization as reported in Collier et al (1986).

Tanzania's equivalence scale

Age	Male	Female
0-2	0.4	0.40
3-4	0.48	0.48
5-6	0.56	0.56
7-8	0.64	0.64
9-10	0.76	0.76
11-12	0.80	0.88
13-14	1.00	1.00
15-18	1.20	1.00
19-59	1.00	0.88
60+	0.88	0.72

Source: World Bank TZ Poverty Assessment, 2015/ Zanzibar 2014/15 Poverty report

Rwanda: Rwanda uses a scale as depicted in Table below. Yet to establish its basis due to the limited information provided in the report.

Rwanda's equivalence scale

Age	Male	Female
<1 year	0.41	0.41
1-3	0.56	0.56
4-6	0.76	0.76
7-9	0.91	0.91
10-12	0.97	1.08
13-15	0.97	1.13
16-19	1.02	1.05
20-39	1.00	1.00
40-49	0.95	0.95
50-59	0.90	0.90
60-69	0.90	0.80
70 plus	0.70	0.70

Source: Extracted from Rwanda poverty report

Burundi's equivalence scale

	Male	Female
1-3 years	0.27	0.27
4-6 years	0.61	0.61
7-9 years	0.73	0.73
10-12 years	0.86	0.73
13-15 years	0.96	0.83
16-19 years	1.02	0.77
20-50 years	1.00	0.77
51 years	0.86	0.79

Source: Extracted from Burundi poverty report

South Sudan: The Republic of South Sudan uses per-capita consumption expenditure

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