INTERNATIONAL MONETARY FUND

IMF Country Report No. 17/296

UGANDA

TECHNICAL ASSISTANCE REPORT—REPORT ON THE PRICES STATISTICS MISSION

September 2017

This technical assistance report on Uganda was prepared by a staff team of the International Monetary Fund. It is based on the information available at the time it was completed on September 2014.

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International Monetary Fund
Washington, D.C.

INTERNATIONAL MONETARY FUND

Statistics Department

UGANDA

REPORT ON THE PRICES STATISTICS MISSION

September 15–26, 2014

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October 10, 2014

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ABBREVIATIONS

AFR	African Department, IMF
CPI	Consumer Price Index
COICOP	Classification of Individual Consumption According to Purpose
COMESA	Common Market for Eastern and Southern Africa
EA	Elementary Aggregate
HCPI	Harmonized CPI
HFMCE	Household Final Monetary Consumption Expenditure
IMF	International Monetary Fund
ICBTS	Informal Cross-border Trade Survey
ICP	International Comparison Program
GDDS	General Data Dissemination Service
MHBS	Mini Household Budget Survey
NA	National Accounts
SDDS	Special Data Dissemination Service
STA	Statistics Department, IMF
SUT	Supply and Use Tables
TA	Technical Assistance
TEMS	Tourist Expenditure and Motivation Survey
UBOS	Uganda Bureau of Statistics
UNHS	Uganda National Household Survey

EXECUTIVE SUMMARY

- In response to a request from the authorities at the Uganda Bureau of Statistics (UBOS) and in consultation with the African Department (AFR), I undertook a Technical Assistance (TA) mission to Kampala during the period September 15–26, 2014 to assess the concepts and methods used to compile the Consumer Price Index (CPI). This activity (15ST054) was undertaken within the context of the following project: Prices Statistics STA_UGA_2013_05.

- The main purpose of the mission was to review the concepts and methods used to compile the new rebased CPI. In addition, the AFR Uganda team has raised a number of concerns with regard to the current CPI series which have been addressed during the mission. These concerns include: (i) Revisions made to published indices after publication; (ii) published inflation rates inconsistent with inflation rates calculated from published indices; (iii) absence of consistency in aggregation; (iv) the average of the index reference period does not match 100; and (v) inconsistent sampling with some items only in one or two areas.

- Compared to the current CPI, the main improvements planned for the rebased CPI include: (i) increasing the geographical coverage by adding Fort Portal as an additional price collection center located in the Western Region; (ii) improving the coverage of Kampala by splitting the baskets from two into three components (i.e., low income, middle income and high income); (iii) improving the classification by switching from a national classification to the *Classification of Individual Consumption According to Purpose* (COICOP); and (iv) increasing product coverage.

- The first release of the rebased CPI is planned for January 2015, with indices being calculated retrospectively to the weight reference period July 2009–June 2010 which will become the new index reference period. For publication, indices and weights will be broken down to the COICOP class level for food and non-alcoholic beverages and to the COICOP division level for the remaining products. The rebased CPI will be chain linked with the previous series at the All Items CPI level.

- The conceptual basis of the rebased CPI was extensively discussed during the mission. The rebasing was considered to be an opportunity to change the conceptual basis of the CPI and to compile weights using the domestic concept. During the mission it was stressed that in order to meet different users' needs and to guarantee temporal consistency with the current CPI, the headline CPI should be based on the national concept. The weights should include both monetary and non-monetary consumption.

- A practical solution agreed with UBOS staff is to derive two different weighting schemes: the first one based on the national concept (including non-monetary

consumption) and the second one based on the domestic concept, where the elementary aggregates (EAs) are identical in the two CPIs.

- The primary data source for deriving the new weighting scheme is the Uganda National Household Survey (UNHS) 2009/2010. An additional survey, called the Mini Household Budget Survey (MHBS), has been conducted in 2014 in order to further disaggregate the expenditures at the lowest levels of the classification. During the period of the mission, data entry and editing was taking place but final results were not yet available.

- During the mission, the preliminary higher-level weights were analyzed. Compared with the current weighting scheme based on the UNHS 2005/2006, the results obtained so far indicate that the Kampala high income basket has a very high share compared to the other two Kampala baskets. It was also found that weights for accommodation and restaurants were unusual. These shifts have to be further analyzed.

- The UNHS data was compared with household consumption derived in the Supply and Use Tables (SUT). Tobacco and beer for instance are significantly underreported in the UNHS. It is recommended to adjust weights for under or over reporting by comparing the UNHS data to other sources.

- For the implementation of the domestic principle, additional sources are used to estimate the expenditures of non-residents in Uganda. The following inconsistencies in these additional data sources were highlighted: (i) the expenditures of resident households abroad are included; and (ii) some business expenditures of tourists in Uganda are included. If the domestic principle is to be followed, then adjustments should be made accordingly.

- A major point discussed during the mission was the absence of consistency in aggregation raised by the AFR. In the current CPI, the aggregation at the national level of group indices does not equal All Items CPI. This has been found to be a consequence of how regional indices are combined into national indices. It has been proposed to change the regional aggregation so that these inconsistencies are removed. The UBOS plans to improve higher-level aggregation in the rebased CPI.

- There is currently a practice to revise the CPI figure of the previous month because of late entry of prices data, especially from education and health service providers. In general, it is recommended that a CPI should not be revised. The UBOS considers the revision policy of the CPI to be a strategic decision that needs further consultation with stakeholders, especially the Bank of Uganda.

- Training on CPI compilation, data collection and data validation was provided to CPI staff. Following a request by the CPI staff, training was also provided on tools in Excel that can be used in the context of CPI production.

- A detailed work program was prepared including the main activities to be undertaken before the rebased CPI can be released.

I. OVERVIEW

1. In response to a request from the authorities at the UBOS and in consultation with the AFR, I undertook a TA mission to Kampala during the period September 15–26, 2014 to assess the concepts and methods used to compile the CPI. This activity (15ST054) was undertaken within the context of the following project: Prices Statistics STA_UGA_2013_05.

2. The mission reviewed the ongoing rebasing exercise of the Ugandan CPI and assisted in deriving the new weighting scheme. In addition, the prices data collection was assessed and a number of technical concerns with regard to the current CPI series were addressed.

3. The concepts and scope of the rebased CPI were reviewed. A preliminary weighting scheme for the higher levels based on data from the UNHS 2009/2010 was analyzed and areas were identified for improving the derivation of the weighting scheme. At the lower levels, expenditures will be further broken down using results from the MHBS which will be available in the near future. Once the weighting scheme will be finalized, the list of EAs included in the rebased CPI can be defined. The compilation method which the UBOS intends to implement for the rebased CPI was reviewed.

4. The first release of the rebased CPI is planned for January 2015, with indices being calculated retrospectively to the weight reference period July 2009–June 2010, which will become the new index reference period. A detailed work program was prepared including the main activities to be undertaken before the rebased CPI can be released.

5. A number of technical issues with regard to the current CPI series were discussed during the mission. An alternative aggregation method was proposed which provides consistent results when aggregating the regional baskets into the national CPI.

6. Training was provided to CPI staff on topics including CPI compilation, data collection and data validation.

7. To assist the authorities and counterparts, this report includes an Executive Summary on the main findings and recommendations. Then, Section I provides an introductory Overview. Section II provides a summary of the Statistics Prerequisites and Section III discusses the Methodological Soundness of the rebased CPI. In Section IV, Part A provides an assessment of the Accuracy and Reliability of Data Sources for Weights and Prices, whereas Part B provides an assessment of the Statistical Techniques. Section V provides an assessment of Serviceability. Finally, Section VI addresses some methodological concerns with regard to the Current CPI Series.

8. Appendix I contains a Work Plan. Appendix II presents an outline of the Training Program. Appendix III provides a numerical example of the inconsistency in aggregation outlined above. Appendix IV describes the relationship between Regions, Sub-Regions, Price Collection Centers and Baskets. An excerpt of the questionnaire of the MHBS is displayed in Appendix V and an example of a product file used in price collection can be found in Appendix VI.

II. STATISTICAL PREREQUISITES

9. The CPI staff is sufficiently experienced and trained to carry out the rebasing of the CPI. The experience gained from the previous rebasing that took place in 2009 can be relied on. Because of major methodological developments, in particular the changeover to COICOP, the rebasing is a resource-intensive exercise. Preparatory works for rebasing the CPI started already in 2012. This year, the Census activities further delayed the finalization of the new weighting scheme and the release of the rebased CPI.

III. METHODOLOGICAL SOUNDNESS

10. The current CPI is divided into eight main groups. Below this level, there are 35 sub-groups, which are represented by 276 items. The UBOS decided to change the classification in the rebased CPI and to adopt COICOP, which is the recommended international standard classification. The changeover to COICOP will improve international comparability and will also contribute to increase coherency with other statistical domains.

11. The 12 divisions of COICOP are divided into groups and classes. In the rebased CPI, the classes are further divided into sub-classes which reflect local circumstances. The classification of food products will be more detailed at these lower levels, as they are likely to represent a large share of the basket. Moreover, price changes for food products tend to be more volatile, which further motivates the need for additional subdivisions. As food prices are a sensitive topic, some user may also be interested in detailed price changes for different commodities.

12. The following goods and services are explicitly excluded from the Ugandan CPI: narcotics, gambling, prostitution, life insurance and illegal transactions.

13. The UBOS compiles a purely urban CPI. Both weights and prices only refer to urban households. As such, price changes occurring in rural areas are not captured. All urban households are in scope, regardless of size of households or income levels but institutional households are excluded.

14. The current CPI is stratified into eight different baskets to account for the regional dimension. There are six baskets for the following urban centers: Jinja, Mbale, Masaka, Mbarara, Gulu and Arua. Furthermore, Kampala is split into two separate baskets

representing high income households on the one hand and middle and low income households on the other hand.

15. In the rebased CPI, the geographical coverage will be expanded by adding Fort Portal as an additional urban center located in the Western region. Moreover, Kampala will be divided into three baskets: low, middle and high income. Thus, the total number of baskets will increase from eight to ten.

16. An enhanced subdivision of the Kampala baskets is sensible because the total Kampala area accounts for around half of the CPI basket. In general, a finer stratification helps to improve the accuracy of the CPI. However, the criterion used to divide households based on income may be subject to debate (see paragraph 49). There also seems to be a slight conceptual difficulty as the Kampala baskets incorporate both a regional and an income dimension, which then has to be crossed again with the "national" or the "domestic" concept (see paragraph 56). Moreover, there is probably a correlation between some areas in Kampala and income levels, which further blurs the distinction between income and location.

17. The current CPI is based on the *national* concept. This means that the CPI covers the non-business expenditures relating to the resident population of Uganda, regardless of where the expenditure takes place.

18. With the rebasing, there are plans to change the conceptual basis of the CPI and to switch to the *domestic* concept. This means that the CPI covers all the expenditures made within the domestic territory of the country, including the non-business expenditure made by foreign visitors.

19. The UBOS explained that the domestic concept was selected in order to meet the needs of regional organizations. During the mission, it was stressed that the recommended option is to continue following the national concept. It is especially important for policy making that price pressures faced by resident households are correctly measured. For international comparability purposes, the headline CPI of Uganda should be based on the national concept. When linking the rebased CPI with past figures, consistency between the two series is desirable in order to obtain long term series based on the same concept.

20. A known limitation of the national concept is that it is impractical to collect prices in foreign countries. A solution commonly adopted consists in including expenditures abroad in the weights, with prices only collected within the country. This relies on the assumption that the price changes within the country are the same as the price changes of the same products abroad.

21. The UBOS plans to restrict the CPI to Household Final Monetary Consumption Expenditure (HFMCE), excluding non-monetary consumption such as food produced by households for their own consumption. In principle, own account production should be included in order to neutralize substitution shifts within an economy on the long run with

households starting to purchase goods which they have previously produced themselves. It can further be argued that the goods and services acquired in non-monetary transactions affect households' living standards. Finally, including imputed expenditures increases the coherency with the deflator of household consumption expenditures in the National Accounts (NA).

22. Imputed rents for own-occupiers are a special example of imputed expenditures. In principle, they should be included. The UBOS argues that the currently collected rent data is not reliable enough to be used for both tenants and owner-occupiers. The weight attached to these prices data would be disproportionate and jeopardize the quality of the CPI. It is thus important to continue improving the rent survey. Coordination within the UBOS on the topic of real estate is planned.

23. In order to meet different users' needs, a solution agreed with UBOS staff is to produce two versions of the CPI: a first one which is based on the national concept and which includes non-monetary consumption except imputed rents and a second one which is based on the domestic concept covering HFMCE.

24. In practice, this can be achieved by having two different weighting schemes. The EAs that enter the two different indices are the same, but the weights used to aggregate them are different. Such an approach is already implemented by the UBOS for the moment, with different weighting schemes but same prices being used for the national CPI on the one hand and for the Harmonized Consumer Price Index (HCPI) compiled to meet the needs of the Common Market for Eastern and Southern Africa (COMESA) on the other hand.

25. In the current CPI, second-hand goods are included for clothing and vehicles using gross weights. As transactions between households cancel out, it is recommended to use net weights. It is planned to improve the valuation of second-hand goods in the rebased CPI.

IV. ACCURACY AND RELIABILITY

A. Source Data

Weights

The Uganda National Household Survey 2009/2010

26. The primary data source for the weights of the rebased CPI is the UNHS which was carried out between July 2009 and June 2010. The main objective of the survey was to collect high quality and timely data on demographic, social and economic characteristics of the household population.

27. The UNHS was based on two-stage sampling. In a first, the country was divided into enumeration areas, of which a sample was drawn. In a second stage, households were

selected within each sampled enumeration area. The UNHS 2009/10 covered a sample size of 6,800 households, compared to 7,400 households in the 20005/06 module. According to the UBOS, the UNHS 2009/10 sample was designed to allow reliable estimation for (i) the whole country, (ii) for rural or urban areas, and (iii) for each of the ten sub-regions.

28. For the recording of the expenditures, different recall periods were used depending on the product: a 7-day recall period was used for expenditure on food, beverages and tobacco; a 30-day recall period was used in the case of household consumption expenditure on nondurable goods and frequently purchased services such as transport and health services; and a 365-day recall period was used for semi-durable and durable goods and services.

The Mini Household Budget Survey

29. In order to further disaggregate the expenditures obtained from the UNHS, an additional survey, called MHBS, was carried out during the third quarter of 2014. As this survey does not cover 12 months, the impact of seasonality on the results should be assessed.

30. Two-stage sampling was used for this survey. First enumeration areas were sampled in the eight price collection centers that are covered in the rebased CPI. Second, 10 households were sampled in each of the 74 sampled enumeration areas.

31. Apart from decomposing expenditures at the lower levels of the CPI, the MHBS may provide additional information on products and outlets which can be consulted when defining and reviewing the EA.

32. During the period of the mission, data entry and editing took place but final results were not available yet. Consequently, the quality of the results obtained with the MHBS could not be assessed.

Other sources

33. In order to estimate the expenditures of non-residents in Uganda, two additional sources are used: (i) The Tourism Expenditure and Motivation Survey (TEMS); and (ii) the Informal Cross Border Trade Survey (ICBTS).

34. The TEMS was carried out in May 2012. The overall objective of this survey was to determine the value of tourism activities in the country as well as current demand for tourism. Questionnaires were handed out to tourists at the main entry points of the country. As a result the survey provided information on the total expenditure of tourists for broad product categories.

35. The ICBTS is carried out on a continuous basis during two weeks each month. It collects information on informal exports and imports from different border points. The data have been classified as far as possible into their respective COICOP categories.

Prices

36. The current price collection program is directly coordinated by the CPI staff. In each of the seven urban price collection centers (eight centers in the rebased CPI), price collectors report to one of the supervisors who belong to CPI staff at the head quarter.

37. In general, prices are collected locally in the different price collection centers. Where there are national pricing policies, such as for water, electricity or telecom services, prices are collected only once and the same price is included in all regional baskets. Second-hand clothing is a particular case because prices are only collected in Kampala and then serve as a proxy price for second-hand clothing in the other baskets.

38. The frequency of price collection depends on the type of product. In some cases, prices are collected only quarterly or even less frequently. Examples are rents, health services, electricity, water charges or education. Prices for telecommunication services are collected whenever there is a change in the tariffs. In general, prices are collected during the week which includes the 15th of the month. For some products which are known to have higher price volatility, such as fresh food, prices are collected twice per month: during the first week of the month and during the mid-week. In Kampala prices for some products are even collected every week for the purpose of the weekly CPI. However, only prices from the first week and from the mid-week are used for the official CPI. There are more than 7,000 prices which enter the CPI every month.

39. A large share of the prices is collected in markets. In this type of environment, prices are observed by purchasing the products. Back at the office, the products are weighted and a unit price is calculated which then enters the price index. This price collection technique allows the UBOS to approximate purchasers' prices as these are only known after a negotiation process is concluded.

40. The selection of outlets is made purposively by the supervisor who initiates the first contact with the outlet. The selection of the particular product to be priced is also made purposively by the supervisor. The strategy is to select a well-sold product which matches the item specifications, in cooperation with the respondents.

41. If a product in a particular outlet is missing for three months, the price collector is directed by his supervisor towards a replacement product which should be as close as possible to the old product but which can be in another outlet. If an outlet closes down, it is replaced by another outlet of the same type in the same area. If the need arises, targeted replacements are also made.

42. Prices are recorded on paper questionnaires. These paper questionnaires contain the name of the item, additional item specifications (as needed) and details of the outlet. The price of the previous month is not included. This is done to ensure that the price collector does not simply copy the last price. However, it should be noted that providing the price of

the previous month helps the price collector in identifying unusual price behavior while being in the outlet. The UBOS previously used that strategy but explained that the quality of prices collected was poorer. The price collector is encouraged to report on events and to provide explanations for price changes. Non-standardized comments can be made on the questionnaire.

43. Data validation techniques are used to detect possible outliers or errors, by testing for instance if price changes lie within certain thresholds. In case unusual prices are identified, the supervisor follows up with the price collector. If needed, the supervisor confirms the price with the respondent. A second price collection is sometimes necessary. The rule is not to edit a reported price unless it has been confirmed that there is an error.

44. Regular training is organized for price collectors at the head office. Written instructions are provided to the price collectors, with details about item specifications and outlet information and frequency of price collection. An example of such a product file can be found in Appendix VI.

45. In general, price data collected are sufficiently detailed by product and use sufficiently detailed product specifications to ensure that period to period price comparisons within the selected outlet refer to the same variety (as determined by price-determining characteristics). This is especially important for heterogeneous products.

46. It was reported that particularly for clothing, some volatile price changes are suspected to be related to changes in quality. Clothing items are described using to some extent specifications taken from the International Comparison Program (ICP). However, in the field, price collectors may have difficulties in properly identifying changes in quality. This can be overcome through additional training and experience. If items are considered to be not comparable, prices should not be directly compared and quality adjustments should be made.

B. Statistical Techniques

Derivation of the weighting scheme

47. A preliminary weighting scheme at the higher levels had been developed by the UBOS using data from the UNHS 2009/10. The analysis was carried out for the 10 baskets separately, which means that the UNHS data was disaggregated into the sub-regions representing these baskets. For Kampala, data was further disaggregated according to the income level of the household. Two sub-regions were left out for the moment because no price collection center is located in these sub-regions. The relationship between the Regions, Sub-regions, Price Collection Centers and Baskets is explained in Appendix IV.

48. Some prior adjustments were needed to bring the UNHS data in line with the concepts of the CPI. Out-of-scope goods and services were removed. Only monetary

consumption of urban households was considered. Some categories of the UNHS in the health, education and rent sector had to be reclassified in order to match with COICOP.

49. During the mission, these preliminary results were analyzed by looking at the total expenditure of each basket. Compared to the basket shares used in the current CPI, there were significant changes for the Kampala baskets. First, the total weight for Kampala relative to the total weight of the other sub-regions dropped significantly. Moreover, within Kampala, the high income basket had a very high share compared to the other two baskets (middle income and low income). It was agreed that the criterion used to define high income households should be reviewed.

50. Underreporting is probably the most serious and common problem affecting household expenditure surveys. Some expenditure are not reported because the products have a social stigma or because the purchases are small and therefore easy to forget. If no adjustments are made, these items will be underestimated in the CPI weights.

51. In practice, correction coefficients can be established by comparing the data from the UNHS with other sources. SUT provide a framework where supplies of different kinds of goods and services originating from domestic industries and imports are allocated between various intermediate or final uses, including household final consumption. During the mission, the UNHS data was compared to household final consumption derived in the SUT. It was found that for tobacco or beer for instance, there was significant underreporting in the UNHS.

52. However, when comparing different data sources, the concepts do not necessarily overlap. For instance, institutional households are not covered in the UNHS but they are included in the NA. The treatment of income in-kind or gifts may be different from the approach adopted in the CPI. Finally, these comparisons have in general to be made at the national level, whereas the CPI weights have a more restricted scope, leaving out rural households and two sub-regions. As such, further adjustments are often needed when making these comparisons.

53. Results were also benchmarked against an alternative data source on household consumption expenditure provided by the NA. A large discrepancy was found for accommodation services and restaurants, even before including tourist expenditures. These shifts have to be further investigated.

54. The shares obtained at the COICOP division level were finally compared to the current CPI shares of the eight main groups. Apart from the issues already mentioned, the results look plausible. This comparison has to be repeated using a more detailed correspondence table between the current classification and COICOP.

55. When implementing the domestic concept, a decision has to be made to which regional basket non-resident expenditure should be allocated. It was decided to assign

informal exports to the sub-region where the border point is located at which the export was recorded.

56. The allocation of tourist expenditure is more difficult because additional assumptions have to be made on the type and location of tourist spending. First, selected tourist sites were assigned to the basket which was geographically closest. Expenditures are allocated proportionally to the number of visits made to these tourist sites. This assignment rule had to be further refined for tourist sites located in Kampala, which is divided into three baskets based on income levels of the resident population. An ad-hoc allocation was proposed for Kampala, which was not entirely satisfactory because of its arbitrariness. It was proposed that for Kampala, the tourism expenditure is assigned to the three baskets proportionally to the total weight of each basket.

57. When implementing the domestic principle, the weights are computed as the sum of resident expenditure (provided by the UNHS) and tourist expenditure (provided by the TEMS) and informal exports (provided by the ICBTS). However, there are some conceptual inconsistencies when using these data sources.

58. The results from the UNHS cover expenditures of residents both in Uganda and abroad. According to the domestic principle, the latter should be excluded. An estimation should be made of the expenditures of residents abroad.

59. Moreover, the amounts recorded by the TEMS contain both business and non-business expenditures. In general, a CPI is restricted to household final consumption. Expenditures made for goods and services in order to produce other goods and services are excluded. If such expenditures are made by non-resident units in Uganda, they should appear in principle under intermediate consumption in their home country. As the TEMS contains information on the purpose of the visit, an additional adjustment should be made.

60. In the future, in order to derive two different weighting schemes in parallel based on the national principle (including non-monetary consumption) and on the domestic principle, data should be structured in way that distinguishes: (i) consumption by residents in Uganda; (ii) consumption by residents abroad; (iii) consumption by non-residents in Uganda; and (iv) own account consumption. This should be available at the higher levels, in order to derive weights based on the different concepts. At the lower levels, the same break downs derived for instance from the MHBS may be used.

61. The weight of a basket is defined as the total consumption in that sub-region. However, there are two sub-regions for which no basket is established. To correct for this, all sub-regions are grouped together into four main regions: Central, Eastern, Western, Northern (see Appendix IV). The total expenditure of the parts not covered is added proportionally to the other baskets of the same region. This will not alter the relative importance of a basket within its region but it will correct the relative weights between the regions. It relies on the

assumption that for each region, the sub-regions included in the CPI represent the parts not covered.

62. As this approach relies on regional expenditure data and not simply on population figures, differences in the average expenditure of a household between the regions are correctly taken into account. The approach adopted also ensures that the structure within a basket refers to the structure of that sub-region and is not distorted by the consumption pattern of the sub-regions not covered. This is especially important because basket indices and weights are published on their own.

63. Although weights refer to a whole sub-region, prices are only collected in one particular urban center located in that sub-region. This assumes that the price changes are the same in the price collection center as in the whole sub-region.

64. Once results from the MHBS are available, it will be possible to further split the expenditures derived from the UNHS and define weights for the EAs. In general, the EAs will be defined at COICOP sub-class level or below.

65. Weights for second-hand goods should be derived using the net principle. The UNHS only contains gross weights so additional sources have to be used to adjust the weights accordingly. The MHBS may provide the information needed to do this adjustment.

66. A cut-off level of one part per thousand will be used for including an EA in the CPI basket. The expenditure of the EAs below this threshold level will be distributed either proportionally to the other EAs of the same COICOP class or they will be assigned to similar EAs. Cut-off levels are defined for each basket separately, so the implicit cut-off levels at the national level may even be lower.

67. The exercise will be concluded by manually reviewing and adjusting the final results if needed. Weights for the different levels of aggregation will be provided in relative terms at the different levels of aggregation.

68. For some COICOP categories such as insurance or financial services, no expenditures were recorded in the UNHS. The UBOS is considering including these types of services in the rebased CPI if reliable weights can be estimated using NA data. In principle, weights for insurance in a CPI should be based on the implicit service charge. The implicit service charges are estimated by the gross premiums plus the income from investment of the insurance reserves less the amounts payable to policy holders in settlement of claims.

69. Once the weighting scheme will be validated, the list of EAs covered in the rebased CPI can be finalized. Within each EA, items have to be selected and item specifications defined. The current prices data has to be mapped into the new classification.

70. In anticipation of the rebasing, the UBOS already started collecting prices for products not yet covered in the current CPI. Prices for the new basket in Fort Portal have already been collected since 2010. However, gaps can still be identified when reviewing the EAs and an additional price collection may still need to be initiated.

Reference period

71. The rebased CPI will be retrospectively calculated up to the weight reference period July 2009–June 2010, which will become the new index reference period.

72. A base price will be estimated which corresponds to the arithmetic average of the prices observed during the 12 months' index reference period. Prices must be imputed if they are not available up to this period. For the purpose of this backward imputation, the UBOS also intends to use prices data from the ICP if needed.

73. The backward revision links the weight and price reference periods and enables the compilation of a Laspeyres price index. This reverses the approach where the expenditures of the weight reference period are price-updated to a later price reference period in order to derive a Lowe price index.

74. The recalculation of past figures provides useful insights because results are presented in a new classification and additional prices collected at the new price collection center or from new products are included. Moreover, substitution bias can be evaluated by comparing the difference between published and recalculated indices. However, extensive use of imputations may impact the results, making them difficult to interpret.

75. No monthly indices will be published for the index reference period which spans over 12 months. The index for the reference period as a whole will be 100 by definition. Consequently, the type of inconsistency described in paragraph 108 will not be visible anymore. However, this does not exempt from correctly estimating base prices in order to avoid biased results.

Index compilation

76. The EAs are the lowest level for which reliable weight information can be obtained. It has been agreed that the default method at the elementary level should be the unweighted geometric mean of the individual price quotes (Jevons price index).

77. Within an EA there may be one or several representative items. This means that the representative items are implicitly weighted by the number of price quotes collected for each of them. Weighting information at the very detailed level is resource intensive to obtain and update. This has to be balanced against the possible gains in terms of a more accurate price index. In the current context, a more transparent option is to use an unweighted approach.

78. Using the appropriate weights, EAs should be progressively aggregated within each basket using the Two-stage (Modified) Laspeyres index formula. Finally, the aggregation of baskets into the national level should be done in a consistent way (see paragraphs 103–105).

Temporarily missing prices

79. Temporarily missing prices are imputed for a maximum of three months. The imputation process is bottom-up by using if possible the average price change within the same EA before moving upwards the classification structure (within the same basket) if no prices are available at the level below. No indicators are produced on the number of missing prices per month, but the CPI staff confirmed that their number was low.

80. There are no items in the current CPI which are explicitly labelled as strongly seasonal. In practice, their treatment will be equivalent to the one of temporarily missing prices.

Quality adjustment

81. In case of replacements, quality adjustments are made in order to capture only pure price changes. In general, the UBOS uses the overlap method. To apply this method, the price of the new and the old product must be available during the same month. Linking with overlapping prices involves making an implicit adjustment for the difference in quality between the two products, as it assumes that the relative prices of the new and old product reflect their relative qualities.

Production system

82. The CPI is compiled in a range of Excel files. The UBOS considers that for the moment the Excel solution should be further developed before switching to an alternative solution. It was found that the production system can be improved by automating repetitive tasks. Manually transferring intermediate results from one file to another should be avoided.

83. Extensive modifications to the current production system are required largely because a different classification will be used in the rebased CPI. The system should be designed in a way that permits the use of different weighting schemes and it should be flexible enough to account for future adjustments in the samples.

Chain linking

84. It is planned to chain link the rebased CPI with the previous CPI series at the All Items level. The new index reference period July 2009–June 2010 will be used as the overlapping period (annual overlap method).

85. In these linked series, price developments during the overlapping period will be consistent with the old CPI while the comparison between July 2010 and the overlapping period on average will be consistent with the rebased CPI. The implicit price change between June 2010 and July 2010 may be flawed.

86. It was discussed whether there is a need linking the rebased CPI series at the COICOP division level with the old series backwards in order to provide continuous long-term series at a more detailed level than All Items. The UBOS considers undertaking such a recalculation if there is a user request.

V. SERVICEABILITY

87. The Ugandan CPI is compiled with a monthly frequency and released on the last day of the reference month. This timeliness exceeds both General Data Dissemination Service (GDDS) and Special Data Dissemination Service (SDDS) standards.

88. Prior to the first release of the rebased CPI, users should be informed in advance about the upcoming change. The UBOS plans to present the rebased CPI to the different CPI consultation committees and to inform the media and the general public about the upcoming rebasing.

89. For publication, indices and weights are broken down to the COICOP class level for food and non-alcoholic beverages and to the COICOP division level for the remaining products. Results will be provided both at the national level and for the 10 baskets separately. In the future, the weight of each basket in the national CPI should also be published, which will increase transparency in terms of the underlying aggregation structure.

90. The UBOS compiles monthly and annual changes using indices with full precision. For publication, weights are rounded to four digits, indices are rounded to two digits and rates of change are rounded to one digit.

91. In the future, the UBOS plans to carry out every year a review of the weights and adjust lower levels as needed. New products can be introduced into the samples, and the weights at the lower level re-established on the basis of more recent information. This practice allows accounting for market developments in between two complete weight revisions.

92. It is recommended to update weights at least every five years. A more frequent update of the weights can be desirable because of changes in the consumption pattern due to substitution behavior or other reasons. A more frequent complete weight revision should be considered if resources permit, especially as data sources such as the UNHS may be available at a higher frequency.

93. With the rebased CPI undergoing significant methodological changes, it is important that the GDSS metadata contains up to date information. The content of the metadata should be reviewed on a regular basis and updated as needed. A comprehensive methodological document should be published in a readily accessible form that should include the website of the UBOS, and updated regularly.

Training

94. Training on CPI compilation, data collection and data validation was provided to CPI staff (see Appendix II). In particular, emphasis was placed on aspects such as chain-linking and adjusting the weights at the lower levels of the classification. Following a request by the CPI staff, training was also provided on advanced tools in Excel that can be used in the context of CPI production.

Work Program

95. A Work Program has been established that details the activities that have to be undertaken before the rebased CPI can be published (see Appendix I). The objective is to release the new CPI in January 2015.

VI. CURRENT CPI SERIES

96. At the request of the AFR Uganda team, a number of concerns related to the current CPI were discussed with the UBOS during the mission. These concerns include: (i) revisions made to published indices after publication; (ii) published inflation rates inconsistent with inflation rates calculated from published indices; (iii) absence of consistency in aggregation; (iv) the average of index-reference-period indices does not = 100; and (v) inconsistent sampling, with some items only sampled in one or two areas.

Revisions

97. In case of late entry of data, especially from education and health service providers, the UBOS policy is to revise the CPI figure of the previous month. It was explained that the delay in price collection is caused by a lack of cooperation from respondents.

98. If price collection for these services could not be completed at the time of publication, the press release clearly indicates the provisional status of the results. The following month, the press release also indicates that the results from the previous month have been revised.

99. The UBOS argues that revising past results improves the quality of the CPI. Taking into account new data as it becomes available helps to make the results more accurate. Revisions are restricted to the previous month and their impacts tend to be marginal.

100. A CPI is commonly used for indexation purposes in business or legal contracts. Therefore, unlike other statistical indicators, a CPI should not be revised.

101. Strategies to avoid revisions include the following:

- Users could be consulted about relaxing the tight publication schedule of the official CPI as early estimates are already published with the weekly CPI.
- Price collection could be accelerated. Respondents should be made aware of the deadlines set for reporting and there should be follow-up procedures to ensure the timely receipt of source data.
- Samples could be reviewed and uncooperative respondents replaced.
- Systematic oversampling could ensure that a sufficient number of prices are collected for the estimation of reliable monthly price changes.

102. The UBOS considers the revision policy of the CPI to be a strategic decision that needs further consultation with stakeholders, especially the Bank of Uganda.

Inconsistency in aggregation

103. Items are first aggregated separately for each of the baskets. In a second step, the sub-group, group and All Items indices of the baskets are aggregated into the corresponding indices at the national level. The same basket shares are used to aggregate sub-groups, groups and the All Items level.

104. It can be shown that inconsistent results are obtained with this aggregation method. The aggregation of groups (or sub-groups) at the national level does not equal the All Items CPI which has been obtained by aggregating the All items level of the different baskets. It is recommended that consistent results are obtained, independently of the sequence of aggregation. During the mission, this issue was extensively discussed with CPI staff.

105. In order to remove this inconsistency, the aggregation method has to be adjusted accordingly. A numerical example is provided in Appendix III. Compared to the current method, the proposed approach would (i) provide identical results for each basket separately; (ii) use the same item weights in each basket and at the national level; and (iii) lead to the same national All Items CPI. However, national indices for groups and sub-groups would differ.

106. The UBOS plans to improve higher-level aggregation in the rebased CPI.

Base period indices

107. The arithmetic average of the indices of the index reference period has to be equal to 100. A consistency check has found that this does not hold for the overall CPI.

108. A top-down analysis was made to find the source of this inconsistency. The Kampala low and middle income basket was the only basket where the average in the index reference period at the All Items level was not equal to 100. Within this basket, all group indices were consistent, except the group covering "health, entertainment and other services." Within this group, the health sub-group had an inconsistent index reference period average. Finally, it was found that for one item in the health sub-group, the index did not average to 100. This was due to an erroneous base price which was different from the arithmetic average of the monthly prices observed during the fiscal year 2005/06, as required.

109. It is recommended to make consistency checks by averaging the index reference period indices. This should be done at all aggregation levels and results should be compiled with sufficient precision.

110. Even minor inconsistencies should be followed-up. They can sometimes be a consequence of more significant problems. Such inconsistencies may also weaken the trust of users in the published CPI figures.

Regional sampling of items

111. The basket consists of 276 items. However, not every item is included in every basket, with 14 percent of items sampled in only one basket and 7 percent of items sampled in only two baskets.

112. It was explained that this unbalanced sampling results from how items were selected during the design phase of the baskets. An item entered a basket only if its expenditure was found to be significant in that basket. This approach guarantees that the accuracy of each basket is sufficient while at the same time facilitating price collection in each area.

113. Items which are sampled in a limited number of baskets correspond almost exclusively to items which are sampled either only in Kampala (high income and middle and low income baskets) or only in the Northern region (Arua and Gulu baskets). It was explained that these two areas are the most different from the rest of Uganda.

APPENDIX I: CPI WORK PLAN

2014

1. Continue the ongoing CPI production	ongoing
2. Compare the UNHS with other sources and correct for under/over reporting	October
3. Validate the regional weights and adjust the Kampala baskets as needed	October
4. Analyze the data from the MHBS	October
5. Finalize the weight derivation	October
6. Compare the new and the old weighting scheme including rationalization of major shifts from the old weighting pattern	October
7. Define the EA, identify the items within each EA and define the item specifications	November
8. Map existing prices data into the new structure	November
9. Estimate base prices	November
10. Review the prices and outlets in each EA and adjust the EA as needed	November
11. Initiate new price collection as needed	November
12. Organize training of price section staff about the rebased CPI	November
13. Finalize and test the compilation system for the rebased CPI	December
14. Calculate price indices from the reference period to now	December
15. Chain-link the old CPI using the reference period as the overlap period	December
16. Pre-announce the upcoming rebasing of the CPI	December
17. Run internal discussions on the results	December

2015

18. Stop price collection for items removed from the rebased CPI	January
19. Prepare the dissemination support for the rebased CPI	January
20. First release of the rebased CPI	January 30
21. Update metadata and prepare documentation of the methodology of the rebased CPI	March

APPENDIX II: CPI TRAINING PROGRAM

1. Introduction

    - The 2004 ILO manual: Consumer Price Index Manual: Theory and practice
    - The 2009 UNECE practical Guide to producing consumer price indices

2. CPI compilation

    - Structure of a CPI
    - Elementary aggregates
    - Higher-level aggregation: Laspeyres, Lowe, Young, Geometric Young
    - Chain-linking

3. Weights

    - Frequency of weight updates
    - Example of an annually chained CPI
    - Updating higher-level weights with NA data
    - Updating lower level weights

4. Sampling

    - Sampling dimensions
    - Random sampling techniques
    - Non-random sampling techniques
    - Examples of sampling in a CPI
    - Sampling error

5. Price collection

    - Centralized and local price collection
    - Selection of outlets and products, loose or tight specifications
    - Importance of pricing the same variety in the same outlet
    - Procedures for substitution
    - Questionnaire
    - Modernization of price collection

6. Data validation

    - Data quality assurance in a CPI
    - Data validation during price collection
    - Statistical methods for data validation

- Calculating the contribution of a sub-index

7. Quality adjustment

    - Temporarily missing prices
    - Implicit quality adjustment methods
    - Explicit quality adjustment methods

8. Training on Excel tools

    - How to use the vlookup function
    - Using pivot tables for data validation and index compilation
    - Doing regressions in Excel
    - Doing sensitivity analysis in Excel with data tables
    - Introduction to writing easy macros for data loading and index compilation

APPENDIX III: REGIONAL AGGREGATION

The following example consists of two regions and two items. Within each region, the weights for each item have been established. Moreover, region 1 one has a weight of 40 percent and region 2 has a weight of 60 percent in the national index. This leads to a national weight for item 1 of 10%*40% + 30%*60% = 22% and for item 2 of 90%*40% + 70%*60% = 78%.

	Item 1	Item 2	Regional weights
Region 1	10%	90%	40%
Region 2	30%	70%	60%
National weights	22%	78%	

For each item within each region, the following price indices have been calculated. The All items index can be calculated for each region taking into account the weighting structure of that region. For region 1, we have 103.1*10% + 105.8*90% = 105.53 and for region 2 we have 110.5*30% + 107.2* 70% = 108.19.

	Item 1	Item 2	All items
Region 1	103.10	105.80	105.53
Region 2	110.50	107.20	108.19

National indices can be calculated using the same regional weights for each level of aggregation. This means that the national index for item 1 is 103.1*40% + 110.5*60% = 107.54 and the national index for item 2 is 105.8*40% + 107.2*60% = 106.64 and the national All items index is 105.53*40% + 108.19*60% = 107.13. The disadvantage of this approach is that the aggregation at the national level of item indices is not identical to the All items index: 107.54 * 22% + 106.64*78% = 106.84.

	Item 1	Item 2	All items
National	107.54	106.64	107.13
Aggregation of item indices			106.84

Alternatively, the following weighting structure can be derived. In region 1, the overall weight for item 1 is 40%*10%=4% and for item 2 is 40%*90% = 36%. In region 2, the overall weight for item 1 is 60%*30%=18% and for item 2 is 60%*70% = 42%. Note that for each item, the regional weights sum up to the national weights. Moreover, within each region, the item weights sum up to the regional weights.

	Item 1	Item 2	Regional weights
Region 1	4%	36%	40%
Region 2	18%	42%	60%
National weights	22%	78%	

This weighting scheme is now used for aggregating into the national level. For item 1, we have (103.1*4%+110.5*18%)/22%=109.15, for item 2, we have (105.8*36%+ 107.2*42%)/78%=106.55 and for the All Items we have (105.53*40%+108.19*60%)/100%= 107.13. With this approach, the aggregation at the national level of item indices is consistent: 109.15*22% + 106.55*78% =107.13

	Item 1	Item 2	All items
National	109.15	106.55	107.13
Aggregation of item indices			107.13

APPENDIX IV: REGIONS, SUB-REGIONS, PRICE COLLECTION CENTERS AND BASKETS

Region	Sub-region	Price Collection Center	Basket
Central	Kampala	Kampala	High Income
			Middle Income (*)
			Low Income (*)
	Central 1	Masaka	Masaka
	Central 2	*not covered*	
Eastern	East central	Jinja	Jinja
	Eastern	Mbale	Mbale
	part of North East	*not covered*	
Northern	Mid-Northern	Gulu	Gulu
	West-Nile	Arua	Arua
	part of North East	*not covered*	
Western	Mid-Western	Fort Portal	Fort Portal (*)
	South Western	Mbarara	Mbarara

(*): New basket compared to the 2005/06 CPI

APPENDIX V: QUESTIONNAIRE OF THE MHBS

UGANDA BUREAU OF STATISTICS

MINI HOUSEHOLD BUDGET SURVEY, 2014.

Purpose of the Survey

The main objective of this mini survey is to decompose the items reported in aggregate form during the Uganda National House Hold Budget Survey (UNHS IV) 2009/2010. The survey will further identify specific products and items consumed by households. During the mini survey, specific products and items consumed by other categories of households will also be identified.

Authority

The information is collected under the provisions of the **Uganda Bureau of Statistics Act, 1998.**

Confidentiality

The information provided on this questionnaire will remain strictly confidential as per the Uganda Bureau of Statistics Act.

We are therefore encouraging everyone who has been selected to answer questions in this form to do so. The information will be used in monitoring the inflation trends in the country and policy formulation by the government.

Yours faithfully,

Dr. Chris N Mukiza

For: Executive Director

TO BE FILLED BY ENUMERATOR

				CODES
NAME OF THE ENUMERATOR				
DISTRICT				
MUNICIPALITY/TOWN COUNCIL				
ENUMERATION AREA (EA)				
HH - ID				
DATE OF INTERVIEW (DD/MM/YYYY)				
START TIME				
END TIME				
FILLING STATUS	1=fully	2=Partially	3=Not filled	

HOUSEHOLD CONSUMPTION EXPENDITURE

(Part A) Food, Beverage, and Tobacco, Restaurants and Hotels (During the Last 7 Days)

ITEM DESCRIPTION		Household Purchases						Consumption out of Purchases				
		Qty	value	unit price	Point of Purchase			Unit of Qty	At Home		Away from Home	
	Code				Location	Outlet type	Outlet Name		Qty	Value	Qty	Value
1	2	3	4	5	6	7	8	9	10	11	12	13
RICE	**1111**											
Kaiso	11111											
Super	11112											
Pakistan	11113											
Other Rice	11119											
BREAD	**1112**											
whole White bread (sweet/Salt)	11121											
whole Brown Bread	11122											
Buns	11123											
Chapati/Sumbusa/Pancakes	11124											
Other Breads	11129											
PASTA PRODUCTS	**1113**											
Spaghetti	11131											
Macaroni	11132											
Other Pasta products	11139											
PASTRY-COOK PRODUCTS	**1114**											
Biscuits	11141											
Cakes	11142											
Doughnuts	11143											
Other Pastry-cook products	11149											
OTHER PRODUCTS	**1115**											
Millet Flour	11151											
Rice flour	11152											
Whole grain maize/millet/sorghum	11153											

OUT LET TYPES CODES: *00= House Holds, 01= Market Stalls, 02= Fixed Place Vendors, 03= Permanent Shops, 04= Supermarkets, 05=Hotels, 06= Bars 07=Restaurants 08 = Students Hostels, 09= Utility Providers 10=Government Agencies 11=Hospitals 12=Pharmacies 13= Drug Shops, 14= Clinics, 15= Providers of Education services, 16= Transport Authorities, 17= Leisure and Entertainment Providers, 18= Whole sale outlets, 19= Mobile Vendors, 20= Butchers 21= Bakeries 22= Bookshop and stationary shops 23= Specialised shops 24= Other service providers, eg. Painters, Plumbers,*

APPENDIX VI: EXAMPLE OF AN ARTICLE FILE

ARTICLE FILE KAMPALA

CPI CODE: **1101** **DESCRIPTION:MATOOKE**

DEFINITION: A green fruit in form of a bunch with clusters attached to a stalk. The clusters have long finger shaped bananas that are eaten when cooked.

WHERE OBSERVED:
In six markets, preferably in the following areas of the market:
Baita Ababiri – inside the market.
Nakulabye – outside the market.
St. Balikudembe – outside the market along Sir Apollo kagwa rd. Kisenyi side.
Kibuye – inside the market.
Bwaise- inside the market.
Nakasero- behind the upper part of the market.

FREQUENCY OF OBSERVATION:
Twice a month, that is, the first Tuesday and Wednesday of the month and the week containing the 15th of the month.

REFERENCE DATE:
The 15th of the month.

MODE OF OBSERVATION:
One bunch is always bought from each market and then weighed on a big scale.

OBSERVED UNITS:
A medium sized bunch of (18-26kg) for each market.

CPI UNIT:
One kilogram

ESTIMATION ROUTINE:
Each matooke bunch bought is weighed and the kg price is calculated. For the two sets of observations, that is, one in the first week of the month and the other in the week having the 15th of the Month; an arithmetic mean is computed for each of the sets of observations and thereafter an arithmetic mean is calculated from the two means as the CPI price.

FILE REFERENCES:
Kampala Market Returns
Kampala Market Averages

MISCELLANEOUS:
Buying of matooke on lorries packed around the market is not accepted.