

**Methodology**

**Consumer Prices Index – 2023**

(Base Year 2021)

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**First: Background of the Survey**

**1.1 Introduction**

Indices is used in the statistical applications in the field of economic studies, as they can identify the economic conditions of different countries, through analysis studies of indices , as well as it helps to predict what may happen to different variables in the future.

In addition, the index measures the developments on prices, volumes, and values of different kinds of statistics, for example: the prices index measures prices changes from time to time. The production index measures the change in production of the industrial sector for different periods. Also, index for foreign trade measures the movement of imports and exports both in terms of size or quantity from time to time. Indices are no longer limited to economists in their analysis, but a means in the hands of people who are interested in social, administrative, and other specialized studies for carrying out future comparisons, analysis, and prospects. Thus, the index is an indicator used in statistical analysis to measure changes in any phenomenon over time that can be expressed digitally.

The indices of consumer prices, are calculated in the DSC based on to the standards and concepts prepared by international and national authorities such as the Consumer Price Index manual 2020. In order to:

* Comparability between the other emirates
* Comparability between the other countries

**1.2 Objectives of the Consumer Prices Index:**

Consumer prices Index (CPI) is one of the important indices, which is keen to be issued by all the statistical centers, so the objectives of CPI can be summarized according to the importance of their use, which they are:

* Consumer prices index is a statistical tools for measuring changes in the prices of consumer goods and services from time to other.
* Consumer prices index is widely used as accurate indicator for measuring trends in inflation and economic recession.
* Consumer prices index is a means for measuring changes in the currency purchasing power.
* Prices index is generally one of the important tools used in preparing national accounts by ridding the national gross income from the impact of prices changes.

**Second: Target Population and Survey Sample Frame**

**2.1 Target Community:**

Studying the prices of group of goods and services in consumer prices system, classified according to the Classification of Individual Consumption according to Purpose (COICOP 2018) in order to calculate the index according to the following division:

1. Food and beverage.
2. Tobacco.
3. Clothing and foot wear.
4. Housing, water, electricity, gas, and other fuels.
5. Furnishings, household equipment and routine household maintenance.
6. Health.
7. Transport.
8. Information and communication.
9. Recreation, sport and culture.
10. Education.
11. Restaurants and accommodation services.
12. Insurance and financial services
13. Personal care, social protection and miscellaneous goods and services.

**2.2 Selection of the base period:**

A specific year is chosen to be the price base period in order to compare the current prices with it and the year 2021 was chosen as a price reference period.

The year 2019 was chosen as the weights reference period, so that it was considered that it should be a natural year, and not be a year punctuated by economic crises, and the year in which the weights were calculated may often coincide with the chosen base year.

**2.3 Preparing the weights:**

A Household Income and Expenditure Survey is used to determine the amount of household spending on goods and services, and in light of this, this expenditure is distributed on all goods and services in a proportional manner, and the goods that represent the consumer basket are selected, whose prices will be collected, and weights (relative representation) are calculated for all goods and materials and the main and sub-groups that make up the general index.

**2.4 Survey Sample Frame:**

The survey sample frame is based on sources that are selling consumer goods and services, where the specialists selected the sources that provide the selected consumer basket, taking into consideration permanent availability of those goods and services and the selected sources cover all areas in the Emirate of Dubai.

**Third: Survey Sample**

**3.1 Sampling Units:**

It is known that the consumer prices cover a broad group of goods and services, and considering the comprehensive census to collect the prices of those goods and services will be costly and may be impossible. In common practice, the collection usually held on a sample of groups of goods and services from a sample number of sources. In fact, if the selection of these sources done in an appropriate way it will result in better data, because of the use of a qualified and trained limited number of data collectors. In this context there are two different types of samples: the first type, is called the probability samples, this type of sampling is selected randomly, and each unit of the subdivision likely determinant different from zero, and can rely on the results of these samples for circulation to the communities in which they pulled them, and determine the degree of confidence in the results and calculation committed errors. The second type, called a non-probability sampling or Purposive sample, this sampling way do not rely on the principles of probability, the sample are selected based on personal control. Due to the lack of census for sources of consumer goods and services in most cases, and complications of designing probability samples to represent the target community and its error calculation techniques. The practice of many countries depends on the non-probability or purposive sampling for the collection of consumer goods and services prices.

As the Emirate of Dubai constitutes of geographical area, and there is a great similarity in the prices of goods and services from different sources. The Dubai Statistics Center implement probability and Non-Probability or purposive samples for the collection of goods and services from the retail, central and services stores, the sample unit was chosen on arbitrary manner or personal control, ensuring coverage of all types of goods and services included in the consumer basket, on a permanent basis.

The total number of goods and services within consumer basket is 2174 commodities collected from 312 sources, considering the exact timing of price collection (weekly, monthly, and quarterly).

**Fourth: Stages of the Survey**

The survey phases included a series of overlapping and integrated operations carried out by the team, depending on the methodology of the governance and management of statistical operations phases to prepare the action plan and timetable for its implementation to ensure completion of the work within the highest quality standards. It included the following:

**4.1 Design Phase**

This phase included the preparation and review and approval of preliminary statistical form also includes sample design and its methodology, preparation of description variables and the design and adoptthe validation, auditing and reviewing rules, as well it includes the methodologies of dataprocessing and reports for the statistical systems.

**4.2 Building Phase**

This phase includes design, preparation and adoption of statistical form, and develop systems for input and calculation of the consumer prices index. As well as, the design and build reports for the statistical systems.

**4.3 Field Data collection Phase**

This phase includes collection of data from the field and it is considered the most important and largest phase of the survey. As it includes the preparation phase where the frame is define and the sample units selected and known. Moreover, it includes develop field data collection methodology, training programs and coordination with target sources. In addition, it includes the field work that involve collection of data from the field and progression report, verification of filling the form, which has been fully automated within the indices system, and includes verifying that all prices are entered into the indices system, whether by entering or scraping the data "Web-scraping".

**4.4 Data Processing Phase**

This phase includes processing of data, which includes the classification and variables coding, implementation of auditing rules, auditing data, adopt raw data, editing missing values, as well it includes linking variable from different sources, weight calculation, calculate results of division and approved pre final database.

**4.5 Analysis Phase**

This phase includes calculating preliminary results and initial indicator calculation, auditing overall results, and comparison of pervious statistics, Data Analysis, Review result and its privacy level, approve final results after revision, coordination with external concerned to approve the final results. Hence, in this phase the general mythology and the approved working methods will be documented.

**4.6 Dissemination Phase**

In this phase, the dissemination process will start by ensuring the results of all reports and its dissemination liability, coordination with concerned statistician to agree on the dissemination level. In addition, the dissemination level should be defined, reviewed and determined in order to be published on the statistical systems. As well as the electronic publication, Press releases on media, manage the DSC social networking channels, Handle CRM Request and respond to our customers inquiries.

**4.7 Evaluation Phase**

The final phase of the project is this phase which includes the evaluation of the statistical project with internal and external authorities’ coordination as well develop and approve the improvement plan.

**Fifth: Main Documents of the Survey:**

The survey documents include the electronic data collection forms, index calculation program, outputs tables, and display of the results, and all of these documents are automated in the indices system.

**5.1 Survey Form:**

A simple electronic form was prepared for each source. The form contained the name of the source, commodities number, description, the items description, barcode, and source of origin, unit, and a place for the price to be recorded.

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**5.2 Data Coding:**

Data was coded according to the Classification of Individual Consumption according to Purpose (COICOP 2018) in order to calculate the index according to main divisions level, group level, and class level reaching to item level as the below example.

**Example:**

|  |  |
| --- | --- |
| **Code (COICOP)** | **Description of division/group/class/commodity/item** |
| **01** | **Food and beverage** |
| **01.1** | **Food** |
| **01.1.1** | **Cereals and Cereal Products** |
| **01.1.1.1** | **Cereals** |
| **01.1.1.1.01** | **Indian Basmati Rice** |

**Sixth: Survey Staff**

**6.1 Functional Structure of Survey Staff:**

The survey staff who participated in technical, administrative, and fieldwork was organized as follows:

* Technical Supervisor of the Survey: The roles include preparing all the technical methodologies related to the study “the integrated methodology, auditing methodology, and results methodology.” In addition, he is the only reference for any technical instructions related to questions, concepts, definitions, and variables of the survey form and any other technical aspects related to the form, in addition training surveyors and preparing a detailed report, calculating and analyzing results.
* Surveyor: A total of 6 surveyor the role involve field visit to collect data, ensure that all required data in form is collected and audit it before living the source, then data entry process they should enter the collected data in the system that use for the consumer price index and the initial audit of the collected data.

**6.2 Staff Selection and Training:**

Since the Surveyor are Department staff, 6 members were selected to work in the survey on different level as supervisor or executive levels according to several bases and pervious experience. A training plan was developed and the staff were trained beginning of the survey and data collection phase. The training includes definition of the survey and its objectives, the data to be collected, and collection mechanism. They were also trained practically on the indices system.

**Seventh: Fieldwork Phase:**

**7.1 Organizing Fieldwork:**

The phase of field preparation and implementation must get the comprehensive care for all details. To ensure the highest possible level of data accuracy and quality, a quality control rules was designed for data collected from the field depending on indices system, through:

* Training the survey staff on fieldwork practically and administratively.
* Providing a series of field and administrative procedures needed to achieve a high level of accuracy, through:
  1. Studying reports from the field and responding to inquiries directly.
  2. Holding regular meetings with field staff to discuss their opinions about goods and services listed in the consumer basket and their prices in different sources.
  3. Continuous monitoring of the field staff performance.
  4. Comparisons and matches for prices of goods and services that are randomly selected to test the field staff performance.
* Field Checks of the Frame:
  1. Supervisory field checks, including:
     + Sources filed visit.
     + Examination according to the alternative methodology.
     + Examining internal correlation of data.
  2. Field checks in the final form while working on the field through the indices system.

After data is collected from field, it will be edited by the field staff, then data will be entered in indices system to include all goods and services data and sources where the prices are collected from. Then, averages will be calculated on item level.

**7.2 Data Collection Method:**

The data is collected through the field visit to the sales sources for the first time, and after identifying the person responsible for the source for the survey and its objectives, an agreement will be made about the preferred data collection mechanism (field/telephone/electronic/ Web scraping), in order to facilitate the collection process for the researcher and the official in The source so that prices of goods and services are collected on a monthly basis for most commodity groups and quarterly or annually for some other groups. As for volatile commodities such as fresh foodstuffs, their prices are collected on a weekly basis. Also, automated price extraction (Web scraping) is used so that the selection of off-peak times is considered to activate the price extraction robot.

**7.3 Field Audit:**

The computer-aided data collection system (CADC) is one of the effective methods for checking field data. Dubai Statistics Center has succeeded in using tablets to collect local prices. These technologies and the necessary infrastructure are available at the center through the establishment of the index numbers system and the GIS system. CADC leads to improvements in the quality of CPI data, especially as increased quality control at the point of data entry helps identify deviations and ensure prices are correct. Computer Aided Data Collection System (CADC) has the potential to significantly improve the quality of the final CPI in the following ways:

**Price history**: Price collection software allows a more comprehensive price history to be made available to the price aggregator. The availability of such data releases less biased data when collecting data and helps ensure that commodity prices are comparable, especially when prices for a particular commodity are variable.

**Quality checks in the field**: The program for collecting prices through the indices system can include several automatic validity checks that can be used to determine where the entered price differs by a certain percentage (positive or negative) from the price of the previous month and the average price of this item on Over the course of a number of months and show notifications for the prices of goods for which the data has not been entered. These notifications provide useful tickers when a price re-check is needed.

The use of a Computer Aided Data Collection System (CADC) significantly reduces the time it takes to make data electronically available at the head office and between data collection and completion. This can be accomplished by:

**Transcription**: Data is collected on tablets, and data can be transmitted directly electronically to servers in the head office in real time.

**Moving from regions**: Electronic dispatch will allow surveyors to send an electronic data file directly to the main office thus avoiding the need for email services or manual delivery forms. This significantly increases the speed of data transmission to the head office and reduces the cost of doing so. In addition, the Dubai Statistics Center can search for the latest price data from all regions as soon as it is received and identify any issues early.

**Advance quality checks**: As the function is available to perform certain quality checks in the field which are usually performed in the office after data is copied, the CAD system enabled the reduction of time taken for a central quality check, or alternatively, the CADC enabled additional quality checks. These improvements through CADC help speed processing which in turn facilitates early deployment and provides opportunities to spend more time analyzing and interpreting, producing press releases and related press releases, or collecting more quotes. The CADC system enables certain checks that improve the efficiency of CPI management, including the following:

- Verify that all prices have been collected before the researcher leaves the source and the electronic data collection form can easily check whether all prices have been collected and reported when not. This mitigates the risk of a researcher inadvertently forgetting to price an item.

- Verify when prices are calculated, the electronic data collection can automatically record the date/time when prices are entered into the tablet and this is useful for validation purposes.

- Indicator Codes CADC provides the opportunity to include additional features in the data collection form. One such feature is indicator symbols which can be used to show when the collected price of an item is for sale, replacement item, missing item, discontinued item etc. This is a simple tool to enhance the ease of validation and management of the list of goods and services.

**Eighth: Data Processing Phase**

**8.1 Office Processing:**

After data is collected from field, a process of data review is carried out by staff members. Office audits can be summarized through the following:

* Prices represent the desired month.
* Prices are in the required currency.
* Prices are collected from all sources needed.
* Quick review of the rationale of the price recorded.
* Do not make any changes to the goods and services description, unit, prices or any data recorded on the form without informing the survey supervisor.
* Not to change the source without informing survey supervisor.
* Receipt of all data from all sources.

In case of mismatch between two prices, the surveyor goes to field once again to make sure of the accurate price. Then prices of goods and services will be entered on indices system for desired month and then reviews the entry process.

**8.2 Electronic Processing:**

Developing an integrated indices system for the prices work in two phases. The first phase is the data entry system for entering monthly prices and calculates the averages prices (monthly, quarterly, annually) for all goods and services in the basket. While the second phase is the calculation system that produce the consumer price index (monthly, quarterly, annually) for all goods and services divisions.

**8.3 Result Dissemination:**

Upon completion of the calculation of the indices the results will calculated and produced to be displayed in private tables and graphs, knowing that the process of dissemination of data should take place according to the rules that have been agreed upon the level of confidentiality, considering the specific standards and regulations according to the following points:

**-** Private controls for confidential data

- Private controls for reduction that is being published

- Private controls for international publishing standards if the statistics is committed to doing internationally

The final results are calculated and produced into two phases, the first phase calculates the average prices for all goods and services (monthly - quarterly - yearly). The second phase is, the average price using the outputs of the first phase for calculating and producing the consumer prices index on (monthly, quarterly, and annually) basis. Hence, the reports are produces in form of tables that are then disseminated in the form of Statistical reports and newsletters and providing those outputs in several ways:

1. DSC Website.
2. DSC’s Smart System.
3. DSC’s Application
4. Periodical press releases.
5. Dubai Statistics Indicators System.
6. Summaries of the most important results in the DSC social media sites.

**Ninth: Main Definitions**

The definitions and classifications used in this survey are based on the international standards issued by the United Nations and some of its specialized agencies as accepted in DSC.

**Data Sources:**

Are the establishments where all data of goods and services in each division are collected from, as retail stores (such as cooperative societies, supermarkets, fabrics and clothing shops, Garments, and furniture shops, etc), and services shops (such as restaurants, cafes, hospitals, private schools, doctors, etc), in addition to the residential units for rent.

**Consumer Price:**

The price paid by the consumer for obtaining a good or service for household needs.

**Division:**

The group of goods and services on which a consumer spends on for household purposes.

**Laspeyres Index:**

A mathematical equation developed by Statistician Laspeyres for calculating price index by dividing prices of the year of comparison by the prices of the base year, and base year weights.

**Price Index:**

The average proportional changes in the prices of a certain goods and services between two time periods.

**Base Period:**

The time period that is compared to the current period.

**Base Period Prices:**

The prices of goods and services to which the current prices are compared.

**Relative importance:**

The ratio of goods and services importance within the consumer basket.

**Indices system:**

Statistical system integrated and developed internally, which manages all statistical processes related to baskets design, recording data, entering and auditing data, conducting statistical data diagnosis and validation and issuing targeted indicators in a manner that meets the statistical quality requirements adopted by Dubai Statistics Center, and ensures the confidentiality of data and information security.

**Web Scraping:**

The process of building software that simulates human browsing of websites and extracts information and data to benefit from them in various fields. The data is extracted as files or stored in hierarchical databases.

**CADC:**

Computer-aided data collection (CADC) using mobile phones, laptops, and tablets.

**Tenth: Improvement Plans:**

* Updating the list of goods and services in the consumer basket.
* Follow on continuous update of the internationally accredited methodologies and classifications.
* Communicating with the sources to discuss the best ways to collect data from them so that the process of collecting the required statement does not represent any additional burden on the sources.
* Qualifying a larger number of team members to carry out more tasks within the project to integrate all team members into all the processes associated with issuing the indicator, which positively affects all technical processes related to the indicator.
* Depending on smart platforms for sources as an additional means to review the conformity of specifications of commodities collected from field sources.
* Reducing the percentage of dependence on the field data source and increasing the percentage of dependence on alternative sources such as collecting data through Web scraping or going to the log data sources.