

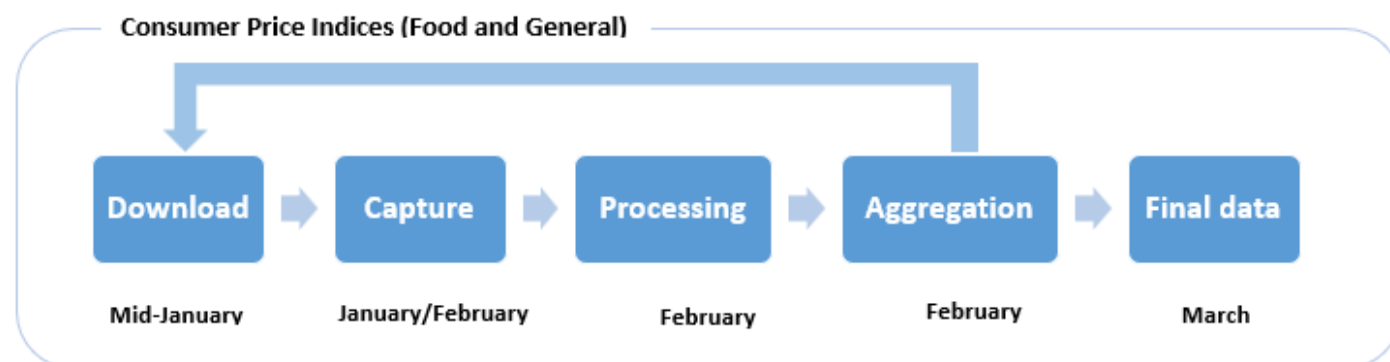
# Food and General Consumer Price Indices Methodology

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## Workflow Overview

The Food and General Consumer Price Indices (CPI) are monthly indices, published on a quarterly basis. The steps and timeline involved in the production of the CPI domain follow a specific process and it is the same for each publication (March, June, September and December). As an example, the process for the first quarter (March) is presented in the following scheme:



## Step 1: Download

The download step performs data download from the following sources and saves them as "Original Data":

1. **IMF:** General Consumer Price Index  
<http://data.imf.org/?sk=5DABAFF2-C5AD-4D27-A175-1253419C02D1&ss=1390030341854>
2. **IMF:** Consumer Price Index of Food and non-alcoholic beverages  
<http://data.imf.org/?sk=4FFB52B2-3653-409A-B471-D47B46D904B5&slid=1485878855236>
3. **UNSD:** Food and non-alcoholic beverages and General Consumer Price Indices  
<https://unstats.un.org/unsd/mbs/app/DataSearchTable.aspx>
4. The Organization for Economic Co-operation and Development (**OECD**)  
[https://stats.oecd.org/Index.aspx?DataSetCode=PRICES\\_CPI#](https://stats.oecd.org/Index.aspx?DataSetCode=PRICES_CPI#)
5. Central Bank of Western African States (**BCEAO**)  
<https://edenpub.bceao.int/index.php#>
6. Eastern Caribbean Central Bank (**ECCB**)  
<https://www.eccb-centralbank.org/statistics-category/other-real-sector>
7. **National statistical offices websites:**

Country	Official Statistics website
Afghanistan	<a href="http://nsia.gov.af/services">http://nsia.gov.af/services</a>
Åland Islands	<a href="https://www.asub.ax/en/statistics/consumer-price-index">https://www.asub.ax/en/statistics/consumer-price-index</a>
Albania	<a href="http://databaza.instat.gov.al/pxweb/en/DST/">http://databaza.instat.gov.al/pxweb/en/DST/</a>
Algeria	<a href="https://www.ons.dz/spip.php?rubrique124">https://www.ons.dz/spip.php?rubrique124</a>
Andorra	<a href="https://www.estadistica.ad/portal/apps/sites/#/estadistica-en">https://www.estadistica.ad/portal/apps/sites/#/estadistica-en</a>
Angola	<a href="https://www.ine.gov.ao/publicacoes/filtro/1/Tudo/Tudo/IPC/N/Tudo/Tudo">https://www.ine.gov.ao/publicacoes/filtro/1/Tudo/Tudo/IPC/N/Tudo/Tudo</a>
Anguilla	<a href="http://statistics.gov.ai/StatisticsDept/ConsumerPriceIndex">http://statistics.gov.ai/StatisticsDept/ConsumerPriceIndex</a>
Antigua and Barbuda	<a href="https://statistics.gov.ag/subjects/consumer-price-index/">https://statistics.gov.ag/subjects/consumer-price-index/</a>

<b>Argentina</b>	<a href="https://www.indec.gov.ar/indec/web/Nivel4-Tema-3-5-31">https://www.indec.gov.ar/indec/web/Nivel4-Tema-3-5-31</a>
<b>Armenia</b>	<a href="https://armstatbank.am/pxweb/en/ArmStatBank/ArmStatBank_1%20Economy%20and%20finance_12%20Consumer%20Prices/?rxid=c169b79c-9f82-4878-a96a-9e404a9f976b,c169b79c-9f82-4878-a96a-9e404a9f976b">https://armstatbank.am/pxweb/en/ArmStatBank/ArmStatBank_1%20Economy%20and%20finance_12%20Consumer%20Prices/?rxid=c169b79c-9f82-4878-a96a-9e404a9f976b,c169b79c-9f82-4878-a96a-9e404a9f976b</a>
<b>Aruba</b>	<a href="https://cbs.aw/wp/index.php/2019/04/26/tables-cpi/">https://cbs.aw/wp/index.php/2019/04/26/tables-cpi/</a>
<b>Australia</b>	<a href="https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/latest-release#data-download">https://www.abs.gov.au/statistics/economy/price-indexes-and-inflation/consumer-price-index-australia/latest-release#data-download</a>
<b>Azerbaijan</b>	<a href="https://www.cbar.az/page-40/statistical-bulletin">https://www.cbar.az/page-40/statistical-bulletin</a>
<b>Bahamas</b>	<a href="https://www.bahamas.gov.bs">https://www.bahamas.gov.bs</a>
<b>Bangladesh</b>	<a href="http://www.bbs.gov.bd/site/page/29b379ff-7bac-41d9-b321-e41929bab4a1/-">http://www.bbs.gov.bd/site/page/29b379ff-7bac-41d9-b321-e41929bab4a1/-</a>
<b>Barbados</b>	<a href="https://stats.gov.bb/subjects/economic-statistics/retail-price-index/">https://stats.gov.bb/subjects/economic-statistics/retail-price-index/</a>
<b>Belize</b>	<a href="https://sib.org.bz/statistics/economic-statistics/consumer-price-index/">https://sib.org.bz/statistics/economic-statistics/consumer-price-index/</a>
<b>Bermuda</b>	<a href="https://www.gov.bm/bermuda-business-statistics">https://www.gov.bm/bermuda-business-statistics</a>
<b>Bhutan</b>	<a href="https://www.nsb.gov.bt/publications/price-statistic/consumer-price-index/">https://www.nsb.gov.bt/publications/price-statistic/consumer-price-index/</a>
<b>Bolivia (Plurinational State of)</b>	<a href="https://www.ine.gob.bo/index.php/graficos-ipc/">https://www.ine.gob.bo/index.php/graficos-ipc/</a>
<b>Bosnia and Herzegovina</b>	<a href="http://www.bhas.ba/Calendar/Category/">http://www.bhas.ba/Calendar/Category/</a>
<b>Botswana</b>	<a href="https://www.statsbots.org.bw/prices-statistics">https://www.statsbots.org.bw/prices-statistics</a>
	<a href="https://botswana.opendataforafrica.org/PROB2015V1/botswana-consumer-price-index">https://botswana.opendataforafrica.org/PROB2015V1/botswana-consumer-price-index</a>
<b>British Virgin Islands</b>	<a href="http://www.bvi.gov.vg/statistics?title=&amp;field_stats_category_tid=701">http://www.bvi.gov.vg/statistics?title=&amp;field_stats_category_tid=701</a>
<b>Brunei Darussalam</b>	<a href="http://www.deps.gov.bn/SitePages/Consumer%20Price%20Index.aspx">http://www.deps.gov.bn/SitePages/Consumer%20Price%20Index.aspx</a>
<b>Burundi</b>	<a href="https://www.isteebu.bi/icp/">https://www.isteebu.bi/icp/</a>
	<a href="https://isteebu.bi/indices-des-prix-a-la-consommation/">https://isteebu.bi/indices-des-prix-a-la-consommation/</a>
<b>Cabo Verde</b>	<a href="https://ine.cv/en/?s=IPC&amp;post_type=all">https://ine.cv/en/?s=IPC&amp;post_type=all</a>

<b>Cambodia</b>	<a href="https://www.nis.gov.kh/index.php/km/20-cpi/31-cpi-tables">https://www.nis.gov.kh/index.php/km/20-cpi/31-cpi-tables</a>
<b>Cameroon</b>	<a href="https://nso-cameroon.opendataforafrica.org/opsgebf/indice-des-prix-%C3%A0-la-consommation-par-fonction-coicop">https://nso-cameroon.opendataforafrica.org/opsgebf/indice-des-prix-%C3%A0-la-consommation-par-fonction-coicop</a>
<b>Cayman Islands</b>	<a href="https://www.eso.ky/indicators_page.html#2">https://www.eso.ky/indicators_page.html#2</a>
<b>Chad</b>	<a href="https://www.inseed.td/index.php/component/jdownloads/category/6-documents-et-publications?start=0">https://www.inseed.td/index.php/component/jdownloads/category/6-documents-et-publications?start=0</a>
	<a href="https://chad.opendataforafrica.org/nspjjyc/indice-des-prix-a-la-consommation">https://chad.opendataforafrica.org/nspjjyc/indice-des-prix-a-la-consommation</a>
<b>China, Hong Kong SAR</b>	<a href="https://www.censtatd.gov.hk/en/scode270.html#section2">https://www.censtatd.gov.hk/en/scode270.html#section2</a>
<b>Comoros</b>	<a href="http://www.inseed.km/">http://www.inseed.km/</a>
<b>Croatia</b>	<a href="https://web.dzs.hr/PXWeb/Menu.aspx?px_language=en&amp;px_type=PX&amp;px_db=Cijen_e">https://web.dzs.hr/PXWeb/Menu.aspx?px_language=en&amp;px_type=PX&amp;px_db=Cijen_e</a>
<b>Curaçao</b>	<a href="https://www.cbs.cw/prices-tables">https://www.cbs.cw/prices-tables</a>
	<a href="https://www.cbs.cw/inflationprices">https://www.cbs.cw/inflationprices</a>
<b>Cyprus</b>	<a href="https://www.cystat.gov.cy/en/SubthemeStatistics?s=47">https://www.cystat.gov.cy/en/SubthemeStatistics?s=47</a>
<b>Djibouti</b>	<a href="http://www.ministere-finances.dj/IPC.html">http://www.ministere-finances.dj/IPC.html</a>
	<a href="http://www.instad.dj/ipc.php">http://www.instad.dj/ipc.php</a>
<b>Dominica</b>	<a href="https://stats.gov.dm/subjects/consumer-price-index/">https://stats.gov.dm/subjects/consumer-price-index/</a>
<b>Ecuador</b>	<a href="https://www.ecuadorencifras.gob.ec/indice-de-precios-al-consumidor/">https://www.ecuadorencifras.gob.ec/indice-de-precios-al-consumidor/</a>
<b>Egypt</b>	<a href="http://www.capmas.gov.eg">www.capmas.gov.eg</a>
<b>Equatorial Guinea</b>	<a href="https://inege.gg/index.php/estadisticas/#36-indice-de-precios-ipc">https://inege.gg/index.php/estadisticas/#36-indice-de-precios-ipc</a>
<b>Fiji</b>	<a href="https://www.statsfiji.gov.fj/statistics/economic-statistics/summary-of-consumer-price-index12.html">https://www.statsfiji.gov.fj/statistics/economic-statistics/summary-of-consumer-price-index12.html</a>
<b>French Polynesia</b>	<a href="https://www.ispf.pf/publication">https://www.ispf.pf/publication</a>
	<a href="http://www.ispf.pf/bases/Indices/Indicedesprixlaconsommation/DonneesIndicesDetaillies.aspx">http://www.ispf.pf/bases/Indices/Indicedesprixlaconsommation/DonneesIndicesDetaillies.aspx</a>

<b>Gabon</b>	<a href="https://statgabon.ga/">https://statgabon.ga/</a>
<b>Gambia</b>	<a href="https://gambia.opendataforafrica.org/pfqlcic/consumer-price-index">https://gambia.opendataforafrica.org/pfqlcic/consumer-price-index</a>
<b>Georgia</b>	<a href="https://www.geostat.ge/en/modules/categories/26/cpi-inflation">https://www.geostat.ge/en/modules/categories/26/cpi-inflation</a>
<b>Ghana</b>	<a href="https://www.statsghana.gov.gh/nationalaccount_macros.php?Stats=MTE2MTIyMjQ5Ni41NjY=/webstats/7163p83s71">https://www.statsghana.gov.gh/nationalaccount_macros.php?Stats=MTE2MTIyMjQ5Ni41NjY=/webstats/7163p83s71</a>
<b>Greenland</b>	<a href="http://bank.stat.gl/pxweb/en/Greenland/Greenland_PR/PRXPRISV.px/?rxid=5e8b3aca-fcce-4b2e-a287-7b9ce9a71fa9">http://bank.stat.gl/pxweb/en/Greenland/Greenland_PR/PRXPRISV.px/?rxid=5e8b3aca-fcce-4b2e-a287-7b9ce9a71fa9</a>
<b>Guatemala</b>	<a href="https://www.ine.gob.gt/ine/estadisticas/bases-de-datos/indice-de-precios-al-consumidor/">https://www.ine.gob.gt/ine/estadisticas/bases-de-datos/indice-de-precios-al-consumidor/</a>
<b>Guinea</b>	<a href="https://www.stat-guinee.org/index.php/publications-ins/publications-infra-annuelles/ihpc">https://www.stat-guinee.org/index.php/publications-ins/publications-infra-annuelles/ihpc</a>
	<a href="https://guinea.opendataforafrica.org/inxkpab/harmonized-consumer-price-index">https://guinea.opendataforafrica.org/inxkpab/harmonized-consumer-price-index</a>
<b>Guinea-Bissau</b>	<a href="https://www.stat-guineebissau.com">https://www.stat-guineebissau.com</a>
<b>India</b>	<a href="https://www.pib.gov.in/indexd.aspx">https://www.pib.gov.in/indexd.aspx</a>
<b>Indonesia</b>	<a href="https://www.bps.go.id/indicator/3/2/1/consumer-price-index-general-.html">https://www.bps.go.id/indicator/3/2/1/consumer-price-index-general-.html</a>
<b>Iran</b>	<a href="https://www.amar.org.ir/english/SCI-News-Archive/articleType/ArchiveView/year/2023">https://www.amar.org.ir/english/SCI-News-Archive/articleType/ArchiveView/year/2023</a>
<b>Jamaica</b>	<a href="https://statinja.gov.jm/Trade-Econ%20Statistics/CPI/NewCPI.aspx">https://statinja.gov.jm/Trade-Econ%20Statistics/CPI/NewCPI.aspx</a>
<b>Japan</b>	<a href="https://www.e-stat.go.jp/en/stat-search/files?page=1&amp;query=coicop&amp;layout=dataset&amp;toukei=00200573&amp;metadata=1&amp;data=1">https://www.e-stat.go.jp/en/stat-search/files?page=1&amp;query=coicop&amp;layout=dataset&amp;toukei=00200573&amp;metadata=1&amp;data=1</a>
<b>Jordan</b>	<a href="https://jorinfo.dos.gov.jo/Databank/pxweb/en/DOS_Database/START_15/CPI_T1/">https://jorinfo.dos.gov.jo/Databank/pxweb/en/DOS_Database/START_15/CPI_T1/</a>
<b>Kazakhstan</b>	<a href="https://stat.gov.kz/edition/publication/month">https://stat.gov.kz/edition/publication/month</a>
<b>Kenya</b>	<a href="https://www.knbs.or.ke/data-releases/">https://www.knbs.or.ke/data-releases/</a>
	<a href="https://kenya.opendataforafrica.org/tuflusb/consumer-price-index">https://kenya.opendataforafrica.org/tuflusb/consumer-price-index</a>
<b>Kiribati</b>	<a href="https://nso.gov.ki/statistics/economy/cpi/">https://nso.gov.ki/statistics/economy/cpi/</a>
<b>Kuwait</b>	<a href="https://www.csb.gov.kw/Pages/Statistics_en?ID=34&amp;ParentCatID=3">https://www.csb.gov.kw/Pages/Statistics_en?ID=34&amp;ParentCatID=3</a>

<b>Lebanon</b>	<a href="http://www.cas.gov.lb/index.php/economic-statistics-en/cpi-en">http://www.cas.gov.lb/index.php/economic-statistics-en/cpi-en</a>
<b>Liberia</b>	<a href="https://www.lisgis.net/index.php">https://www.lisgis.net/index.php</a>
<b>Libya</b>	<a href="https://www.bsc.ly/#">https://www.bsc.ly/#</a>
<b>Madagascar</b>	<a href="https://madagascar.opendataforafrica.org/otovlvf/consumer-price-index?lang=en">https://madagascar.opendataforafrica.org/otovlvf/consumer-price-index?lang=en</a>
<b>Malawi</b>	<a href="http://www.nsomalawi.mw/index.php?option=com_content&amp;view=article&amp;id=186&amp;Itemid=37">http://www.nsomalawi.mw/index.php?option=com_content&amp;view=article&amp;id=186&amp;Itemid=37</a>
<b>Maldives</b>	<a href="https://statisticsmaldives.gov.mv/cpi/">https://statisticsmaldives.gov.mv/cpi/</a>
<b>Malta</b>	<a href="https://nso.gov.mt/en/News_Releases/View_by_Unit/Unit_A5/Price_Statistics/Pages/Retail-Price-Index.aspx">https://nso.gov.mt/en/News_Releases/View_by_Unit/Unit_A5/Price_Statistics/Pages/Retail-Price-Index.aspx</a>
<b>Micronesia (Federated States of)</b>	<a href="https://www.fsmstatistics.fm/economics/consumer-price-index/">https://www.fsmstatistics.fm/economics/consumer-price-index/</a>
<b>Moldova</b>	<a href="https://statbank.statistica.md/PxWeb/pxweb/en/40%20Statistica%20economica/40%20Statistica%20economica_05%20PRE_PRE010_serii%20lunare/PRE012300.px/?rxid=8e69070f-3ac5-4b22-ab66-eab8ee8cc25a">https://statbank.statistica.md/PxWeb/pxweb/en/40%20Statistica%20economica/40%20Statistica%20economica_05%20PRE_PRE010_serii%20lunare/PRE012300.px/?rxid=8e69070f-3ac5-4b22-ab66-eab8ee8cc25a</a>
<b>Montenegro</b>	<a href="https://monstat.org/eng/page.php?id=26&amp;pageid=26">https://monstat.org/eng/page.php?id=26&amp;pageid=26</a>
<b>Myanmar</b>	<a href="http://mmsis.gov.mm/sub_menu/statistics/statDbList.jsp?vw_cd=MT_ZTITLE&amp;self_id=195_003">http://mmsis.gov.mm/sub_menu/statistics/statDbList.jsp?vw_cd=MT_ZTITLE&amp;self_id=195_003</a>
<b>Namibia</b>	<a href="https://nsa.org.na/page/publications/">https://nsa.org.na/page/publications/</a>
<b>Nepal</b>	<a href="https://www.nrb.org.np/category/economic-bulletin/?department=red">https://www.nrb.org.np/category/economic-bulletin/?department=red</a>
<b>New Caledonia</b>	<a href="https://www.isee.nc/economie-entreprises/economie-finances/prix-a-la-consommation">https://www.isee.nc/economie-entreprises/economie-finances/prix-a-la-consommation</a>
<b>Nigeria</b>	<a href="https://nigerianstat.gov.ng/elibrary?queries=cpi">https://nigerianstat.gov.ng/elibrary?queries=cpi</a>
	<a href="https://nigeria.opendataforafrica.org/NGNBSNCPiR2017/cpi-and-inflation-report-december-2018">https://nigeria.opendataforafrica.org/NGNBSNCPiR2017/cpi-and-inflation-report-december-2018</a>
<b>Oman</b>	<a href="https://data.gov.om/OMPRCINX2017/price-index?regions=1000000-oman">https://data.gov.om/OMPRCINX2017/price-index?regions=1000000-oman</a>
<b>Pakistan</b>	<a href="https://www.pbs.gov.pk/nsdp">https://www.pbs.gov.pk/nsdp</a>
	<a href="https://www.sbp.org.pk/publications/Inflation_Monitor/index2.htm">https://www.sbp.org.pk/publications/Inflation_Monitor/index2.htm</a>

<b>Palau</b>	<a href="https://www.palau.gov.pw/executive-branch/ministries/finance/budgetandplanning/consumer-price-index-cpi/">https://www.palau.gov.pw/executive-branch/ministries/finance/budgetandplanning/consumer-price-index-cpi/</a>
<b>Papua New Guinea</b>	<a href="https://www.nso.gov.pg/statistics/economy/consumer-price-index/">https://www.nso.gov.pg/statistics/economy/consumer-price-index/</a>
<b>Peru</b>	<a href="https://www.inei.gob.pe/estadisticas/indice-tematico/economia/">https://www.inei.gob.pe/estadisticas/indice-tematico/economia/</a>
	<a href="https://www.inei.gob.pe/biblioteca-virtual/boletines/informe-de-precios/1/">https://www.inei.gob.pe/biblioteca-virtual/boletines/informe-de-precios/1/</a>
<b>Philippines</b>	<a href="https://psa.gov.ph/price-indices/cpi-ir">https://psa.gov.ph/price-indices/cpi-ir</a>
<b>Puerto Rico</b>	<a href="https://indicadores.pr/dataset/indice-de-precios-al-consumidor/resource/8000e26b-fe31-4b2a-8197-9aed6922edae">https://indicadores.pr/dataset/indice-de-precios-al-consumidor/resource/8000e26b-fe31-4b2a-8197-9aed6922edae</a>
<b>Qatar</b>	<a href="https://www.psa.gov.qa/en/statistics1/pages/topicslisting.aspx?parent=Economic&amp;child=Priceindices">https://www.psa.gov.qa/en/statistics1/pages/topicslisting.aspx?parent=Economic&amp;child=Priceindices</a>
<b>Republic of North Macedonia</b>	<a href="https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Ceni_IndeksTrosZivot/120_CeniTr_Mk_IndTroZi_ml.px/table/tableViewLayout2/?rxid=46ee0f64-2992-4b45-a2d9-cb4e5f7ec5ef">https://makstat.stat.gov.mk/PXWeb/pxweb/en/MakStat/MakStat_Ceni_IndeksTrosZivot/120_CeniTr_Mk_IndTroZi_ml.px/table/tableViewLayout2/?rxid=46ee0f64-2992-4b45-a2d9-cb4e5f7ec5ef</a>
<b>Romania</b>	<a href="http://statistici.insse.ro:8077/tempo-online/#/pages/tables/inse-table">http://statistici.insse.ro:8077/tempo-online/#/pages/tables/inse-table</a>
<b>Saint Lucia</b>	<a href="https://www.stats.gov.lc/subjects/economy/prices-and-price-indices/">https://www.stats.gov.lc/subjects/economy/prices-and-price-indices/</a>
<b>Saint Vincent and the Grenadines</b>	<a href="https://stats.gov.vc/subjects/prices-and-price-indices/consumer-price-index-cpi-monthly-bulletins/">https://stats.gov.vc/subjects/prices-and-price-indices/consumer-price-index-cpi-monthly-bulletins/</a>
<b>Samoa</b>	<a href="https://www.sbs.gov.ws/economics">https://www.sbs.gov.ws/economics</a>
<b>San Marino</b>	<a href="https://www.statistica.sm/pub1/StatisticaSM/en/Dati-statistici/Prezzi-e-retribuzioni/Prezzi.html">https://www.statistica.sm/pub1/StatisticaSM/en/Dati-statistici/Prezzi-e-retribuzioni/Prezzi.html</a>
<b>Sao Tome and Principe</b>	<a href="https://www.ine.st/index.php/component/phocadownload/category/78-ipc-ano">https://www.ine.st/index.php/component/phocadownload/category/78-ipc-ano</a>
<b>Saudi Arabia</b>	<a href="https://www.stats.gov.sa/en/394">https://www.stats.gov.sa/en/394</a>
<b>Seychelles</b>	<a href="https://www.nbs.gov.sc/statistics/consumer-price-indices">https://www.nbs.gov.sc/statistics/consumer-price-indices</a>
	<a href="https://www.nbs.gov.sc/downloads/economic-statistics/consumer-price-index">https://www.nbs.gov.sc/downloads/economic-statistics/consumer-price-index</a>
<b>Sierra Leone</b>	<a href="https://nso-sierraleone.opendataforafrica.org/kiwibig/consumer-price-index">https://nso-sierraleone.opendataforafrica.org/kiwibig/consumer-price-index</a>
	<a href="https://www.statistics.sl/index.php/cpi.html">https://www.statistics.sl/index.php/cpi.html</a>

<b>Singapore</b>	<a href="https://www.singstat.gov.sg/find-data/search-by-theme/economy/prices-and-price-indices/visualising-data/consumer-price-index-dashboard">https://www.singstat.gov.sg/find-data/search-by-theme/economy/prices-and-price-indices/visualising-data/consumer-price-index-dashboard</a>
<b>Solomon Islands</b>	<a href="https://www.statistics.gov.sb/press-releases">https://www.statistics.gov.sb/press-releases</a>
<b>Somalia</b>	<a href="https://somalia.opendataforafrica.org/ownvtkc/consumer-price-index">https://somalia.opendataforafrica.org/ownvtkc/consumer-price-index</a>
<b>South Sudan</b>	<a href="https://nbs.gov.ss/">https://nbs.gov.ss/</a>
<b>Sri Lanka</b>	<a href="http://www.statistics.gov.lk/InflationAndPrices/StaticInformation/MonthlyNCPI">http://www.statistics.gov.lk/InflationAndPrices/StaticInformation/MonthlyNCPI</a>
<b>Suriname</b>	<a href="https://statistics-suriname.org/consumenten-prijs-indexcijfers-en-inflatie/">https://statistics-suriname.org/consumenten-prijs-indexcijfers-en-inflatie/</a>
<b>Syrian Arab Republic</b>	<a href="https://cbssyr.sy/cpi-2019-EN.htm">https://cbssyr.sy/cpi-2019-EN.htm</a>
	<a href="https://www.cb.gov.sy/index.php?page=list&amp;ex=2&amp;dir=publications&amp;lang=1&amp;service=8&amp;act=560">https://www.cb.gov.sy/index.php?page=list&amp;ex=2&amp;dir=publications&amp;lang=1&amp;service=8&amp;act=560</a>
<b>Thailand</b>	<a href="http://www.price.moc.go.th/en/content1.aspx?cid=1">http://www.price.moc.go.th/en/content1.aspx?cid=1</a>
<b>Timor-Leste</b>	<a href="https://inetl-ip.gov.tl/?s=Consumer+Price+Index&amp;submit=">https://inetl-ip.gov.tl/?s=Consumer+Price+Index&amp;submit=</a>
<b>Tonga</b>	<a href="https://tongastats.gov.to/statistics/economics/consumer-price-index/">https://tongastats.gov.to/statistics/economics/consumer-price-index/</a>
<b>Trinidad and Tobago</b>	<a href="https://cso.gov.tt/subjects/economic-indicators/retail-price-index-rpi/">https://cso.gov.tt/subjects/economic-indicators/retail-price-index-rpi/</a>
<b>Tunisia</b>	<a href="http://www.ins.tn/en/statistiques/90">http://www.ins.tn/en/statistiques/90</a>
<b>Uganda</b>	<a href="https://www.ubos.org/explore-statistics/30/">https://www.ubos.org/explore-statistics/30/</a>
<b>Ukraine</b>	<a href="http://www.ukrstat.gov.ua/imf/arhiv/isc_e.htm">http://www.ukrstat.gov.ua/imf/arhiv/isc_e.htm</a>
	<a href="https://bank.gov.ua/en/statistic/macro-indicators#1">https://bank.gov.ua/en/statistic/macro-indicators#1</a>
<b>United Arab Emirates</b>	<a href="https://fcsc.gov.ae/en-us/Pages/Statistics/Statistics-by-Subject.aspx#/%3Fsubject=Economy&amp;folder=Economy/Prices/Consumer%20Price%20Index">https://fcsc.gov.ae/en-us/Pages/Statistics/Statistics-by-Subject.aspx#/%3Fsubject=Economy&amp;folder=Economy/Prices/Consumer%20Price%20Index</a>
<b>United Republic of Tanzania</b>	<a href="https://www.nbs.go.tz/index.php/en/consumer-price-index-cpi">https://www.nbs.go.tz/index.php/en/consumer-price-index-cpi</a>
<b>Uzbekistan</b>	<a href="https://stat.uz/en/">https://stat.uz/en/</a>
	<a href="https://stat.uz/en/press-releases/34346-2023-2">https://stat.uz/en/press-releases/34346-2023-2</a>



	<a href="https://stat.uz/en/official-statistics/prices-and-indexes">https://stat.uz/en/official-statistics/prices-and-indexes</a>
<b>Vanuatu</b>	<a href="https://vnso.gov.vu/index.php/en/statistics-by-topic/cpi-news">https://vnso.gov.vu/index.php/en/statistics-by-topic/cpi-news</a>
<b>Venezuela (Bolivarian Republic)</b>	<a href="http://www.ine.gov.ve/index.php?option=com_content&amp;view=category&amp;id=108&amp;Itemid=62">http://www.ine.gov.ve/index.php?option=com_content&amp;view=category&amp;id=108&amp;Itemid=62</a>
<b>Yemen</b>	<a href="http://www.cso-yemen.com/content.php?lng=arabic&amp;cid=144">www.cso-yemen.com/content.php?lng=arabic&amp;cid=144</a>
<b>Zambia</b>	<a href="https://www.zamstats.gov.zm/publications/">https://www.zamstats.gov.zm/publications/</a>
<b>Zimbabwe</b>	<a href="https://www.zimstat.co.zw/">https://www.zimstat.co.zw/</a>
	<a href="https://zimbabwe.opendataforafrica.org/xqjvwob/national-summary-data-page-nsdp">https://zimbabwe.opendataforafrica.org/xqjvwob/national-summary-data-page-nsdp</a>

#### Additional data sources for filling data gaps:

##### 1. United Nations Conference on Trade and Development (UNCTAD): Annual General CPI

<https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=37469>

##### 2. UNdata:

###### - Annual Food CPI:

<http://data.un.org/Data.aspx?q=consumer+price+index+datamart%5bIFS%2cLABORSTA%5d&d=LABORSTA&f=tableCode%3a7C>

###### - Annual General CPI:

<http://data.un.org/Data.aspx?q=consumer+price+index+datamart%5bIFS%2cLABORSTA%5d&d=LABORSTA&f=tableCode%3a7A>

## Step 2: Data Capture

The capture step aggregates all disparate excel files downloaded in step 1 from the Original Data sources in two files (one for General CPI and another for food CPI). The major steps are outlined below.

- Capture Food and General CPI from the International Monetary Fund (IMF) for the remaining countries.
- Filling the data gaps in Food and General CPI in IMF by UNSD data, then by OECD, BCEAO and ECCB data, then by the Official country data of Food and General CPI from the Official Statistics Websites.

- c. For Countries that publish only quarterly CPI data, the CPI data are stored in their respective month (CPI of quarter 1 in March, CPI of quarter 2 in June, CPI of quarter 3 in September and CPI of quarter 4 in December). And for the countries that have Annual CPI in some years, the data are stored in December. And other countries have biannual CPI data, stored in January and in July.
- d. The base year of Food and General CPI in UNSD, OECD, BCEAO, ECCB, UNCTAD and UNdata databases are provided along with the downloaded data files, and the IMF base year is provided under the following link: <http://data.imf.org/regular.aspx?key=61015892>
- e. Annual General and Food CPI are captured from UNdata from 2000 to 2008 and Annual General CPI is captured from UNCTAD from 2000 to 2020 (the Annual CPI data are stored in December of every year), Monthly CPI are imputed in this period using Linear Interpolation for filling data gaps for some countries<sup>1</sup>.

Two output files are generated (one for General CPI and another one for food CPI) and fed into the processing stage.

## Step 3: Processing

### 3.1. Rescaling to the unique base 2015

The processing stage performs rescaling of the General and Food CPI data to a unique base year of 2015.

We use the following formula to rescale the base year to 2015<sup>2</sup>:

$$\text{Monthly CPI in month } t \text{ with base year 2015} = \frac{\text{Monthly CPI in month } t}{\text{geometric mean of the Monthly CPI in all months of 2015}} * 100$$

$$CPI_{t,y,base=2015} = \frac{CPI_{t,y}}{\sqrt[n]{\prod_{t=1}^n CPI_{t,y=2015}}}$$

where  $CPI_{t,y} = CPI$  for month  $t$  and year  $y$  and  $t = 1, 2, \dots, 12$

### 3.2. Imputation methodology for filling the data gaps

Missing values, both monthly and annual prices, can be imputed either according to the Holt-Winters method (Cipra et al., 1995), for which a standard routine of the smoothing technique is embedded in Excel, or by employing the *Linear, Spline or stineman* interpolation method, through a routine in R.

<sup>1</sup> <https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=37469>

<sup>2</sup> International Labour Office (ILO), International Monetary Fund (IMF), Organization of Economic Co-Operation and Development (OECD), Statistical Office of European Communities (Eurostat), United Nations and the World Bank. 2004. "Consumer Price Index Manual – Theory and Practice". Available at: [https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/presentation/wcms\\_331153.pdf](https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/presentation/wcms_331153.pdf)

## 1. Imputation using R function “impute\_lm” from “simputation” R package

We used the Linear Regression Imputation package (simputation) to backcast and impute missing values of Food CPI of countries having only annual Food CPI using the General CPI as an explanatory variable.

Linear regression model imputation with impute\_lm can be used to impute numerical variables based on numerical and/or categorical predictors.

**The Syntax is:** `impute_lm(dat, formula, add_residual = c("none", "observed", "normal"), na_action = na.omit,...)`

### Arguments:

Dat	[data.frame], with variables to be imputed and their predictors.
Formula	Formulas are of the form: <code>IMPUTED_VARIABLES ~ MODEL_SPECIFICATION [   GROUPING_VARIABLES ]</code> The left-hand-side of the formula object lists the variable or variables to be imputed. The right-hand side excluding the optional GROUPING_VARIABLES model specification for the underlying predictor.
add_residual	Type of residual to add. "normal" means that the imputed value is drawn from $N(\mu, sd)$ where $\mu$ and $sd$ are estimated from the model's residuals ( $\mu$ should equal zero in most cases). If <code>add_residual = "observed"</code> , residuals are drawn (with replacement) from the model's residuals. Ignored for non-numeric predicted variables.
na_action	What to do with missings in training data. By default, cases with missing values in predicted or predictors are omitted.
...	Further arguments passed to <ul style="list-style-type: none"><li>• <code>lm</code> for <code>impute_lm</code></li><li>• <code>rlm</code> for <code>impute_rlm</code></li><li>• <code>glmnet</code> for <code>impute_en</code></li></ul>

## 2. Imputation using R function “na\_interpolation” from imputeTS R package.

The function uses either linear, spline or stineman interpolation to replace missing values.

We used the *linear* interpolation which is a consistently well-behaved method of interpolation.

The function returns the values of an interpolating function that runs through a set of points in the  $xy$ -plane according to the algorithm of Stineman (1980).

**The syntax is:** `na_interpolation(x, option = "linear", maxgap = Inf, ...)`<sup>3</sup>

### Arguments:

- X            Numeric Vector ([vector](#)) or Time Series ([ts](#)) object in which missing values shall be replaced
- Option      Algorithm to be used. Accepts the following input:
- "linear" - for linear interpolation using [approx](#)
  - "spline" - for spline interpolation using [spline](#)
  - "stine" - for Stineman interpolation using [stinterp](#)
- Maxgap     Maximum number of successive NAs to still perform imputation on. Default setting is to replace all NAs without restrictions. With this option set, consecutive NAs runs, that are longer than 'maxgap' will be left NA. This option mostly makes sense if you want to treat long runs of NA afterwards separately.
- ...           Additional parameters to be passed through to [approx](#) or [spline](#) interpolation functions

According to Stineman, the interpolation procedure has the following properties:

1. If values of the ordinates of the specified points change monotonically, and the slopes of the line segments joining the points change monotonically, then the interpolating curve and its slope will change monotonically.
2. If the slopes of the line segments joining the specified points change monotonically, then the slopes of the interpolating curve will change monotonically.

Suppose that the conditions in (1) or (2) are satisfied by a set of points, but a small change in the ordinate or slope at one of the points will result conditions (1) or (2) being no longer satisfied. Then making this small change in the ordinate or slope at a point will cause no more than a small change in the interpolating curve."

The method is based on rational interpolation with specially chosen rational functions to satisfy the above three conditions.

Stineman states that "The complete assurance that the procedure will never generate 'wild' points makes it attractive as a general-purpose procedure".

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<sup>3</sup> <https://www.rdocumentation.org/packages/imputeTS/versions/3.2/topics/na.interpolation>

### 3. Forecasting future values using the excel function "FORECAST.ETS" (EXPONENTIAL TRIPLE SMOOTHING)

Future values of CPIs are forecasted based on existing (historical) values, by employing a practical double-exponential smoothing method, including trend features, using the Holt-Winters (HW) method (Cipra, 1992) for seasonal series. Beyond the smoothing parameter  $\alpha$ , the HW method includes one more parameter accounting for trend, specified according to the following general formulation adapted from Tularam and Saeed (2016):

$$f_t = \alpha_1 \pi_t + (1 - \alpha_1)(f_{t-1} + \beta_{t-1}), \text{ with } 0 < \alpha_1 < 1;$$

$$\beta_t = \alpha_2 (f_t - f_{t-1}) + (1 - \alpha_2)\beta_{t-1}, \text{ with } 0 < \alpha_2 < 1;$$

in which  $f_t$  is the forecast,  $\alpha_1$  is the smoothing parameter,  $\beta_t$  and  $\beta_{t-1}$  are the estimated trend parameters, and  $\alpha_2$  is the smoothing parameter for the trend estimates. The parameters are chosen to minimize the in-sample sum of squared forecast errors.

The predicted value is a continuation of the historical values in the specified target date, which should be a continuation of the timeline. This function can be employed to predict future sales, inventory requirements, or consumer trends.

**The syntax is:** FORECAST.ETS(target\_date, values, timeline, [seasonality], [data\_completion], [aggregation])<sup>4</sup>

#### Step 4: Aggregation General and Food CPI

In this process we aggregate the General and Food CPI to a Global, Regional, Sub-Regional level according to the UNSD-FAO M49 classification:

- World
- Africa (Southern Africa, Western Africa, Northern Africa, Middle. Africa, Eastern Africa)
- Americas (Latin America and the Caribbean, and Northern America)
- Latin America and the Caribbean (South America, Central America, Caribbean)
- Northern America
- Asia (Central Asia, Eastern Asia, South-Eastern Asia, Western Asia, Southern Asia)
- Europe (Southern Europe, Eastern Europe, Northern Europe, Western Europe)
- Oceania

And we aggregate the General and Food CPI to at the 4 income levels and at the global level:

- World

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<sup>4</sup> <https://support.microsoft.com/en-us/office/forecast-ets-function-15389b8b-677e-4fbd-bd95-21d464333f41>

- High-income economies
- Low-income economies
- Lower-middle-income economies
- Upper-middle-income economies

The regional Food and General CPI and the aggregated Food and General CPI at income level are calculated using 2 different statistical methods:

1. A weighted average of food and general CPI of countries under each region and each income group using the weights of Household final consumption expenditure (including non-profit institutions serving households) in 2015 in USD at constant prices of 2015. Household final consumption expenditure is available under <https://unstats.un.org/unsd/snaama>, in table “GDP and its breakdown at constant 2015 prices in US Dollar”.
2. Median of food and general CPI values in every month of countries under each region and each income group.

## Step 5: Final Data and Publication

This activity occurs by the end of each quarter, March, June, September and December.

The above steps produce the Consumer price Indices file which contains two items: the General CPI and the Food CPI, at country and regional levels. This final step separates the processed variable and their associated flags into the proper domains for publication in FAOSTAT.

The CPI database is updated on a quarterly basis. All updates follow the same steps as described above. Updates are published in June, September and December.

## Analytical Report on Annual Inflation of General and Food CPI:

Annual Analytical brief of Food and General CPI at the end of the first Quarter, and a general overview of Food and General CPI at the end of second, third and fourth quarters, available on <http://www.fao.org/food-agriculture-statistics/data-release/economics/en/>

The analytical report highlights the annual inflation rates of the regional and sub-regional Food and General CPI, and the annual inflation rates of the aggregated Food and General CPI at income levels that are calculated as a Median of food and general CPI values of countries and territories within each region, within each income group.

The annual inflation rates are calculated using this formula:

$$r_{(t,t-12)} = \left( \frac{CPI_t}{CPI_{t-12}} - 1 \right) * 100; \text{ where } t = \text{month}$$

## References

1. Cipra, T., Trujillo, J., and Robio, A. (1995). Holt-Winters method with missing observations. *Management Science*, 41(1), 174-178.
2. Stineman, R. W. (1980). A consistently well-behaved method of interpolation. *Creative Computing*, 6(7), 54-57.
3. Tularam, G. A., & Saeed, T. (2016). The use of exponential smoothing (ES), Holts and Winter (HW) and Arima models in oil price analysis. *International Journal of Mathematics, Game Theory, and Algebra*, 25(1), 13.