NATIONAL BUREAU OF STATISTICS
SOMALIA

National Accounts Concepts, Sources, and Methods

Somalia

2022

NATIONAL BUREAU OF STATISTICS
SOMALIA

National Accounts Concepts, Sources,
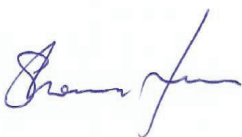and Methods - Somalia

2022

Preface

Gross Domestic Product (GDP) is a key indicator of the country's economic state, providing estimates of production levels and growth across the economy. While much effort has been made to secure new sources of data and improve the quality of data from existing sources, there remains a need to update the assumptions about the economy's structure underlying the SNBS's current model for GDP compilation. The outputs of the Economic Statistics Directorate are widely followed and utilized by government, international agencies, researchers, the media, private sector and non- governmental organizations.

The aim of this discussion document is to provide an overview of the Concepts, Sources, and Methods of Somalia's National accounts. It is designed for users, such as researchers, economic and financial analysts, as well as other users looking to gain a better understanding of Somalia National Accounts compilation and the economy in general.

The concepts have been developed with in line with the relevant international standard, System of National Accounts, 2008 (2008 SNA). The sources document the various data used to compile Somalia's GDP, including the Population Estimation Survey (2014), financial Statements from government, the Consumer Price Index, and UN ComTrade. The methods describe the techniques used by the SNBS to overcome limitations in source data and implement international best practice. In 2018, the first GDP estimate was compiled since 1987 by Somali national experts, calculated using the expenditure approach. The use of the expenditure approach in current and constant 2015 prices dataset is one of the first steps towards transforming the data collected via the Somalia High Frequency surveys.

I am therefore excited to have this first report of Concepts, Sources, and Methods of Somalia's National accounts. It spells out the SNBS's current model for GDP compilation. All these measures are consistent with the System of National Accounts (SNA). I hope it will be used to guide in Concepts, Sources, and Methods of Somalia's National accounts process.

Last, but not least, I would like to thank the technical teams in the National Bureau of Statistics and the IMF for preparing this report. The National Bureau will do its best to improve on the GDP data availability of the country and we welcome your comments and suggestions on this document.

Sharmarke Mohamed Farah

Director General

Somalia National Bureau of Statistics

Table of Contents

Abbreviations

2008 SNA	System of National Accounts, 2008
BEC	Classification by Broad Economic Categories
cif	cost, insurance and freight
COICOP	Classification of individual consumption by purpose
CPI	Consumer Price Index
FGS	Federal Government of Somalia
fob	free on board
GCF	Gross Capital Formation
GDP	Gross Domestic Product
GFCE	Government Final Consumption Expenditure
HFCE	Household Final Consumption Expenditure
ICT	Information and Communications Technology
LMIS	Livestock Management Information System
NPISH	Non-Profit Institutions Serving Households
PESS	Population Estimation Survey (for Somalia)
SITC	Standard International Trade Classification
SLS	Somaliland Shilling
SNBS	Somalia National Bureau of Statistics
SOS	Somali Shilling
UN	United Nations
US	United States of America
USD	United States Dollar

Glossary

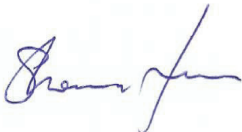|	
Benchmark	Low frequency or irregular data used to set the level of a national accounts item in a given period. An example is the Somali High Frequency Survey (used to set the level of household final consumption expenditure in 2017). Beyond the last available benchmark, estimates must be constructed via extrapolation.
Costs of Production	Intermediate Consumption, Compensation of Employees, Gross Operating Surplus plus Other Taxes less Subsidies on Production.
Extrapolation	The application of (percentage) movements in a given series (eg. population growth) to a given benchmark (eg. household final consumption expenditure in 2017) to extend a time series (eg. household consumption in constant prices between 2012 and 2021) beyond the last benchmark value.
Implicit Deflator	The ratio of a current price and constant price series.
Market Output	Output intended for sale at economically significant prices (2008 SNA para 6.99). Output which does not meet this definition is either output for own final use or non-market output.
Non-market Output	Goods and individual or collective services produced by non-profits institutions servicing households (NPISHs) or government that are supplied free, or at prices that are not economically significant, to other institutional units or the community as a whole (2008 SNA para 6.128)
Output for own final use	Products retained by the producer for his own use as final consumption or capital formation (2008 SNA para 6.114).
Price Deflation	The application of a price index (eg. a consumer price index) as a divisor to a given current price series (eg. household final consumption in current prices) to produce a constant price series.
Purchasers' Prices	The amount paid by the producer, excluding any value added tax or similar tax deductible by the purchaser, in order to take delivery of a unit of a good or service a the time or place required by the purchaser (2008 SNA para 6.64).

Acknowledgement

The key objective of this manual is to provide an overview of the Concepts, Sources, and Methods of Somalia's National accounts. It is designed for users, such as researchers, economic and financial analysts, as well as other users looking to gain a better understanding of Somalia National Accounts compilation and the economy in general.

Our sincere gratitude is to the Management and Staff of SNBS in the development of the concepts, Sources, and Methods. I also thank key stakeholders for their invaluable comments that led to the overall improvement of this manual. The National Bureau of Statistics would like to acknowledge the contribution and support of the National accounts staff who demonstrated diligence, selflessness, commitment and hard work .

Equal gratitude goes to the great SNBS team, led by the able Deputy Director General Mr. Abdirahman Omar Dahir for their tireless dedication in compiling this crucial statistical information for the country. I would also like to acknowledge the role played by Hashim Sheikh Abdinoor and Chris Hinchcliffe for their invaluable expertise in the entire process.

Lastly, special thanks are due to the Federal Government of Somalia, the Sweden Statistics, World Bank, IMF, AfDB and other development partners for their continued technical and financial assistance towards strengthening the NSS in the country.

Sharmarke Mohamed Farah

Director General

Somalia National Bureau of Statistics

Introduction

Gross Domestic Product (GDP) is the monetary value of the goods and services produced by an economy within a given period. It can be calculated using three different measures: production, income, or expenditure. The SNBS uses the expenditure measure to compile an annual time series commencing in 2012 as this makes best use of the Somalia's existing data.

The expenditure measure of GDP is derived as the sum of expenditure on final consumption plus gross capital formation plus exports less imports (2008 SNA para 16.47). This can be expressed as:

$$GDP = Final\ Consumption + Capital\ Formation + Exports - Imports$$

This manual describes the concepts, sources, and methods used by the SNBS for each component of GDP[1]. The concepts have been developed with in line with the relevant international standard, *System of National Accounts,* 2008 (2008 SNA). The sources document the various data used to compile Somalia's GDP, including the Population Estimation Survey (2014), financial statements from government, the Consumer Price Index, and UN ComTrade. The methods describe the techniques used by the SNBS to overcome limitations in source data and implement international best practice.

Ten frequently asked questions are also addressed (Annex 2) to assist users of Somalia's national accounts statistics.

The expenditure measure of GDP's components

Consumption: Household Final Consumption Expenditure (HFCE)

Concept

Household final consumption expenditure (HFCE) consists of "expenditure incurred by resident households on consumption goods or services ....

[and] the estimated value of barter transactions, goods and services received in kind, and goods and services produced and consumed by the same household" [2008 SNA para 9.56]. The concept is further elaborated in 2008 SNA paras 9.56 – 9.80.

Significant examples of Somalia's HFCE include: household consumption of bread, cereal, rice, and pasta. It also includes the value of fruit and vegetables produced and consumed by the same household as well as in kind donations provided by non-residents.

HFCE differs from consumption as defined in the Somali High Frequency Survey. An example is the decision to treat significant purchases (eg. consumer durables such as refrigerators, ovens, washing machines etc) as capital formation, and thus show their consumption as they depreciate across multiple periods. HFCE does not consider these items as capital formation, and therefore records the full value of the purchase in the period when the household took ownership.

Sources

- Somali High Frequency Survey[2]
- SNBS Consumer Price Index
- Somaliland Consumer Price Index
- Estimated Resident Population
- SOS per USD exchange rate published by Central Bank of Somalia
- SLS per USD exchange rate published by Central Bank of Somaliland
- UN ComTrade database

Method

Benchmark

The 2017 Benchmark for HFCE is $7,968m. It is predominately based on the Somali High Frequency Survey Wave II. The benchmark disaggregates HFCE into three categories as shown in the below table:

---

[1]Estimated resident population is stequired to convert per capita consumption estimated by source data to (economy wide) household expenditure, as well as to derive GDP per capita. The concept, source and method used for Somalia's estimated resident population is provided in Annex 1.

[2]The SNBS has used Wave II of the Somali High Frequency Survey. This decision has been based on comparison with this survey's previous two iterations (Annex 3).

SOMALIA HFCE CATEGORY	CONCORDANCE TO COICOP	2017 BENCHMARK ($m)
Food and beverages including cooked food	Food and non-alcoholic beverages (COICOP Division 01) and Restaurants, cafés and the like (COICOP Class 11.1.1)	4,510
Housing	Housing, Water, Electricity, Gas, and Other Fuels (COICOP Division 04)	1,859
All other goods and services	All other COICOP categories	1,599
ALL GOODS AND SERVICES		**7,968**

Food and beverages including cooked food

Estimates of per capita annual consumption based on the Somali High Frequency Survey Wave II have been obtained for individuals in the following twelve categories:

- Nomadic
- Internally Displaced Persons
- Rural: Awdal, Togdheer, Woqooyi
- Rural: Bay, Bakool, Lower Shabelle
- Rural: Hiraan, Middle Shabelle, Galgaduud
- Urban: Awdal, Sanaag, Sool, Togdheer
- Urban: Banadir
- Urban: Bari, Mudug
- Urban: Bay, Bakool, Lower Shabelle
- Urban: Hiraan, Middle Shabelle, Galgaduud
- Urban: Nugaal
- Urban: Woqooyi, Galbeed

The remaining seven categories (below) were outside the scope of the Somali High Frequency Survey Wave II. Estimates of per capita consumption have been obtained based on the following assumptions:

- **Rural: Bari.** Per capita annual consumption identical to Rural: Awdal, Togdheer, Woqooyi
- **Rural: Nugaal.** Per capita annual consumption identical to Rural: Awdal, Togdheer, Woqooyi
- **Rural: Mudug.** Per capita annual consumption identical to Rural: Awdal, Togdheer, Woqooyi
- **Rural: Juba.** Per capita annual consumption identical to (weighted by estimated resident population) average per capita annual consumption of Rural: Bay, Bakool, Lower Shabelle and Rural: Hiraan, Middle Shabelle, Galgaduud

- **Urban: Juba.** Per capita annual consumption identical to (weighted by estimated resident population) average per annual capita consumption of Urban: Bay, Bakool, Lower Shabelle and Urban: Hiraan, Middle Shabelle, Galgaduud
- **Rural: Gedo.** Per capita annual consumption identical to (weighted by estimated resident population) average per annual capita consumption of Rural: Bay, Bakool, Lower Shabelle and Rural: Hiraan, Middle Shabelle, Galgaduud
- **Urban: Gedo.** Per capita annual consumption identical to (weighted by estimated resident population) average per annual capita consumption of Urban: Bay, Bakool, Lower Shabelle and Urban: Hiraan, Middle Shabelle, Galgaduud

Per capita annual consumption for each of the nineteen categories is multiplied by the corresponding estimated resident population. The results are summed to obtain the benchmark estimate ($4,510m).

Housing

Estimates of per capita annual consumption based on the Somali High Frequency Survey Wave II have been obtained for individuals in all twelve categories. Estimates for the remaining seven categories have been obtained using the same set of assumptions as per Food and beverages including cooked food.

Per capita annual consumption for each of the nineteen categories is multiplied by the corresponding estimated resident population. The results are summed to obtain the benchmark estimate ($1,859m).

All other goods and services

Estimates of per capita annual consumption[3] based on the Somali High Frequency Survey Wave II have been obtained for individuals in all twelve categories. Estimates for the remaining seven categories have been obtained using the same set of assumptions as per Food and beverages including cooked food.

Per capita annual consumption for each of the nineteen categories is multiplied by the corresponding estimated resident population. The results are summed to obtain a survey-based estimate ($1,228m).

Two adjustments (+$371m) are applied to produce the benchmark estimate ($1,599m):

- Survey based estimates for Khat and Tobacco are increased by 80 percent to account for expected undercoverage. The selection of 80 percent is a judgment based on analysis of neighbouring economies and available production and trade data.

- A proportion (90 percent) of imported "Assets" are added. "Assets" has been defined as "Durable Consumer Goods" (BEC Category 61) identified within the UN ComTrade database. Somalia's imports data has been obtained by summing exports to Somalia by reporting countries. The resulting estimate from ComTrade has been increased by 107 percent (15 percent to convert from a fob to a cif valuation[4], 20 percent for customs duties, and 50 percent for trade and transport margins) to record these items at purchasers' prices. The selection of 107 percent is a judgment based on analysis of neighbouring economies and available production and trade data.

Annual Estimates outside the Benchmark

Food and beverages including cooked food

Current price estimates are compiled by reflating the constant price series (below) with the following price index:

$$0.7 \times CPI_{SNBS,t} \times \frac{SOS\ per\ USD_t}{SOS\ per\ USD_{2017}} + 0.3 \times CPI_{SOMALILAND,t} \times \frac{SLS\ per\ USD_t}{SLS\ per\ USD_{2017}}$$

where:

- $CPI_{SNBS,t}$ refers to the CPI for Food and non-alcoholic beverages (COICOP Division 01) published by the Somalia National Bureau of Statistics in year t

- $CPI_{SOMALILAND,t}$ refers to the CPI for Food and non-alcoholic beverages (COICOP Division 01) published by the Somaliland Central Statistics Department in year t

- $SOS\ per\ USD_t$ refers to the Somali Shilling per USD exchange rate published by the Central Bank of Somalia

- $SLS\ per\ USD_t$ refers to the Somaliland Shilling per USD exchange rate published by the Central Bank of Somaliland

The weighting of these components (70 percent Somalia excluding Somaliland / 30 percent Somaliland) reflects an estimate of the relative size of these two regional economies in 2017.

This method ensures the above price index is the corresponding implicit deflator for this HFCE component.

---

[3]Per capita consumption excluding: (a) Food and Beverages including cooked food; and (b) Housing. It also excludes depreciation of items considered capital formation by the Somali High Frequency Survey.

[4]Free-on-board (fob) is the valuation reported in by the reporting country. It records the valuation as it leaves the exporter's customs frontier. Cost, insurance, freight (cif) is the valuation reported by the importing country. It records the valuation as it enters the importer's customs frontier. The difference between cif and fob prices includes the insurance and freight.

The constant price series is compiled by extrapolation from the Benchmark. The relevant indicator is Somalia's estimated resident population. This method assumes the volume of consumption per capita does not change over time.

Housing

The method for this component uses the CPI for Housing, Water, Electricity, Gas, and Other Fuels (COICOP Division 04). It is otherwise identical to Food and beverages including cooked food.

All other goods and services

The current price series is compiled by extrapolation from the benchmark. The relevant indicator is a subset of imports to Somalia recorded within the UN ComTrade database, namely:

$$0.5 \times Passenger\ Motor\ Vehicles_t + 0.9\ x\ Durable\ Consumer\ Goods_t + Semi\ Durable\ Consumer\ Goods_t$$

where:

- Passenger Motor Vehiclest = exports to Somalia in year t classified to Broad Economic Category 51. It is assumed half of all imported Passenger Motor Vehicles form part of HFCE
- Durable Consumer Goodst = exports to Somalia in year t classified to Broad Economic Category 61. It is assumed 90 percent of all Durable Consumer Goods form part of HFCE
- Semi Durable Consumer Goodst = exports to Somalia in year t classified to Broad Economic Category 62

The constant price series are obtained by price deflation with the following deflator:

$$0.7 \times CPI_{SNBS,t} \times \frac{SOS\ per\ USD_t}{SOS\ per\ USD_{2017}} + 0.3 \times CPI_{SOMALILAND,t} \times \frac{SLS\ per\ USD_t}{SLS\ per\ USD_{2017}}$$

where:

- CPISNBS,t refers to the CPI All Groups excluding Food and Housing published by the Somalia National Bureau of Statistics in year t
- CPISOMALILAND,t refers to the CPI All Groups excluding Food and Housing published by the Somaliland Central Statistics Department in year t

- SOS per USDt refers to the Somali Shilling per USD exchange rate published by the Central Bank of Somalia
- SLS per USDt refers to the Somaliland Shilling per USD exchange rate published by the Central Bank of Somaliland

The weighting of these components (70 percent Somalia excluding Somaliland / 30 percent Somaliland) reflects an estimate of the relative size of these two regional economies in 2017.

Consumption: Government final consumption expenditure (GFCE)

Concept

Government final consumption expenditure comprises "expenditure [by general government], including expenditure whose value must be estimated indirectly, incurred by general government on both individual consumption goods and services and collective consumption services" (2008 SNA para 9.114). The concept is further elaborated in 2008 SNA paras 9.84 – 9.102.

Examples of Somalia's GFCE include:

- the value of collective services produced by general government units such as the SNBS or Ministry of Finance. The value of these services is typically estimated indirectly (by summing the costs of production)
- the value of individual services purchased by general government from sectors other than general government, such as health care. These individual services are typically provided to individuals at no charge. The value of GFCE is reduced by the value of any payment made to government by the individual (as this amount is considered a sale of a good or service by general government and forms part of other aggregates such as HFCE)

Source

- Financial Statements issued by the Ministry of Finance for Federal Government of Somalia (FGS) and five regions - Galmudug, Jubaland, Puntland, Somaliland, and South West State.

- SNBS Consumer Price Index
- Somaliland Consumer Price Index
- SOS per USD exchange rate published by the Central Bank of Somalia
- SLS per USD exchange rate published by the Central Bank of Somaliland

Method

Benchmark

The 2017 Benchmark for GFCE is $486m. The benchmark disaggregates GFCE between Central Government and State & Local Government as shown in the below table:

LEVEL OF GOVERNMENT	2017 BENCHMARK ($m)
Central and State Government	437
Local Government	49
GENERAL GOVERNMENT	**486**

Central and State Government

GFCE comprises output of Somalia's general government units less sales of goods and services. All output of Somalia's general government is considered non-market output or output for own final use, and thus estimated by summing compensation of employees, intermediate consumption, and consumption of fixed capital.

The resulting benchmark is obtained as follows:

ITEM IN NATIONAL ACCOUNTS	ITEM IN FINANCIAL STATEMENTS	2017 BENCHMARK ($m)
Compensation of Employees	Compensation of Employees (FGS, Galmudug, South West State)	4,510
Wages & Salaries (Jubaland, Puntland)	Housing, Water, Electricity, Gas, and Other Fuels (COICOP Division 04)	1,859
Labour Costs (Somaliland)	289	
Intermediate Consumption	Use of goods and services	205
Consumption of Fixed Capital	Assumed as 2 percent of Compensation of Employees and Intermediate Consumption	10
(less) Sales of Goods and Services	Assumed as 13 percent of Compensation of Employees and Intermediate Consumption	(-) 66
GOVERNMENT FINAL CONSUMPTION EXPENDITURE		**437**

Local Government

GFCE of local government is assumed as 10 percent of GFCE for Somalia's General Government. It is therefore $49m (10 percent x $437m / (100 percent – 10 percent)).

Annual Estimates outside the Benchmark

Benchmarks for all periods spanned by the time series are compiled using the same method described above. This is possible as a time series of Compensation of Employees and Intermediate Consumption for all Federal Government of Somalia and the five regions is available in all periods, with the following exceptions:

- Jubaland (2013): The percentage change in Wages and Salaries and Use of Goods and Services between 2013 and 2014 is assumed equal to the percentage change in the corresponding items (Compensation of Employees and Use of Goods and Services) reported by FGS.

- Galmudug and South West State (2013, 2014, and 2015): The percentage change in Compensation of Employees and Use of Goods and Services between each of these periods and 2016 is assumed equal to the percentage change in the corresponding items (Compensation of Employees and Use of Goods and Services) reported by FGS.

- FGS and all regions (2012): Preliminary estimates of Compensation of Employees and Use of Goods and Services in 2012 and 2013 were provided by FGS as the first charts of accounts following its establishment were issued. These values are inconsistent with existing FGS time series and likely to be significantly understated. The percentage change in these items has been used to extrapolate the aggregates for 2013 (to 2012) for Compensation of Employees and Intermediate Consumption for FGS and all five regions.

- The (assumed) proportion of compensation of employees and intermediate consumption used to estimate sales of goods and services is not held constant throughout time. This proportion increases over time to reflect an (assumed) increase in the proportion of fees charged by general government. The proportion varies from 7 percent (2012, 2013), 10 percent (2014), 12 percent (2015), 11 percent (2016), and 13 percent (2017, 2018, 2019, and 2020). This proportion is estimated based data provided by Somalia's Ministry of Finance for 2021 and all subsequent periods.

Estimates will be used where audited (and thus final) financial statements are unavailable when the national accounts are compiled. Estimates are typically provided by the relevant Ministry of Finance department or determined by the SNBS using movements from similar regions. Revisions will occur when the following year's national accounts are compiled and audited financial statements replace estimates.

The constant price series are obtained by summing constant price estimates for Compensation of Employees, Intermediate Consumption, Consumption of Fixed Capital, and Sales of Goods and Services.

Constant price series for Compensation of Employees and Intermediate Consumption are constructed via price deflation with the following deflator:

$$0.7 \times CPI_{SNBS,t} \times \frac{SOS \ per \ USD_t}{SOS \ per \ USD_{2017}} + 0.3 \times CPI_{SOMALILAND,t} \times \frac{SLS \ per \ USD_t}{SLS \ per \ USD_{2017}}$$

where:

- $CPI_{SNBS,t}$ refers to the CPI All Groups (Compensation of Employees) and CPI All Groups excluding Food (Intermediate Consumption) published by the Somalia National Bureau of Statistics in year t

- $CPI_{SOMALILAND,t}$ refers to the CPI All Groups (Compensation of Employees) and CPI All Groups excluding Food (Intermediate Consumption) published by the Somaliland Central Statistics Department in year t

- SOS per USDt refers to the Somali Shilling per USD exchange rate published by the Central Bank of Somalia

- SLS per USDt refers to the Somaliland Shilling per USD exchange rate published by the Central Bank of Somaliland

The weighting of these components (70 percent Somalia excluding Somaliland / 30 percent Somaliland) reflects an estimate of the relative size of these two general government sectors in 2017.

Constant price series for Consumption of Fixed Capital are constructed as an assumed proportion (2 percent) of the constant price series for Compensation of Employees and Intermediate Consumption. The current price series has been constructed by reflating the constant price series using the Consumer Price Index.

Sales of Goods and Services are constructed as a proportion of the current price series for Compensation of Employees and Intermediate Consumption. The constant price series has been constructed by price deflation with the Consumer Price Index excluding Food.

Consumption: Non-profit institutions serving households (NPISH) final consumption expenditure

Concept

NPISH final consumption expenditure comprises "the expenditure, including expenditure whose value must be estimated indirectly, incurred by resident NPISHs on individual consumption goods and services and possibly on collective consumption services" (2008 SNA para 9.115).

Examples of Somalia's NPISH final consumption expenditure include: the value of services produced by mosques, selected resident non-government organisations, and non-market clubs and societies. The value of these services is typically valued by summing the costs of production.

Source

No source has been identified for this component of GDP. The SNBS continues to work to the FGS Ministry of Finance to assemble a register of resident NPISH units. The resulting register can be used to extract relevant income and expense items (if available via the FGS Ministry of Finance) or conduct a dedicated business survey. An alternative strategy is to estimate donations made by households to NPISH units, possibly via the Integrated Household Budget Survey scheduled for 2022.

Method

NPISH final consumption is set equal to zero. It is likely that a portion of NPISH final consumption has been included with HFCE (eg. Goods purchased by a household and donated to a mosque are likely to be captured within All other goods and services).

Gross capital formation (GCF)

Concept

Gross capital formation "shows the acquisition less disposal of produced assets for purposes of fixed capital formation, inventories or valuables" (2008 SNA para 10.24). Examples of Somalia's gross capital formation include: construction of residential dwellings, acquisition less disposal of heavy vehicles (fixed capital formation), and acquisition less disposal of fuel used to generate electricity (inventories). Somalia does not separately identify fixed capital formation, inventories, and valuables at present due to limited source data.

Source

- UN ComTrade database
- US Export Price Indexes

Method

Benchmark

The 2017 Benchmark for GCF is $784m. The benchmark disaggregates GCF as shown in the below table:

ASSET[5]	2017 BENCHMARK ($m)
Dwellings, Other buildings and structures	418
Transport equipment	139
ICT equipment, Other machinery and equipment	228
TOTAL	**784**

Dwellings, Other buildings and structures

Estimates have been compiled using imports of the following twelve items from the UN ComTrade database:

- Stone, Sand, and Gravel (SITC Group 273)
- Builders' joinery and carpentry of wood, including cellular wood panels, assembled flooring panels, shingles and shakes (SITC Sub-group 635.3)
- Floor coverings, etc (SITC Group 659)
- Lime, cement, and fabricated construction materials (except glass and clay materials) (SITC Group 661) Clay construction materials and refractory construction materials (SITC Group 662)
- Mineral manufactures n.e.s. (SITC Group 663)
- Glass (SITC Group 664)
- Iron and steel (SITC Division 67)
- Structures and parts of structures, n.e.s., of iron, steel or aluminium (SITC Group 691)

---

[5]The three assets which underlie Somalia's GCF estimates are a subset of the international standard (2008 SNA Table 10.2). Some of the excluded assets (eg. Entertainment, literary or artistic originals) are likely to be relatively small. Others (eg. Cultivated biological resources) are likely to be significant and therefore result in understatement of GDP. They will be considered as part of future developments.

- Wire products (excluding insulated electrical wiring) and fencing grills (SITC Group 693)
- Prefabricated buildings (SITC Group 811)
- Sanitary, plumbing and heating fixtures and fittings, n.e.s. (SITC Group 812)

Somalia's imports have been obtained by summing exports to Somalia by reporting countries.

The resulting estimate is then increased by 47.66 percent (15 percent to convert from a fob to a cif valuation, 7 percent for customs duties, and 20 percent for trade and transport margins) to record these items at purchasers' prices.

It is then assumed:

- one eleventh of the required building materials are produced from within Somalia (rather than imported); and
- thirty percent of all GCF does not relate to building materials (eg. labour, operating surplus, and other taxes less subsidies on production). This means an additional 42.9 percent (= 1/0.7) is added to the purchasers' price valuation to account for activity undertaken within Somalia to transform imported building materials into dwellings, other buildings and structures.

The resulting benchmark ($418m) reflects GCF of Dwellings, Other buildings and structures undertaken in 2017.

This method is sub-optimal and suggests GCF is the lowest quality of the expenditure measure of GDP's components. An improved method is expected when a time series of business accounts is available.

Transport equipment

Estimates have been compiled using imports of half of "Passenger Motor Vehicles" (BEC Category 51) plus all of "Other Transport Equipment" (BEC Category 52) identified within the UN ComTrade database. Somalia's imports have been obtained by summing exports to Somalia by reporting countries. Half of "Passenger Motor Vehicles" has been discarded as it is considered part of HFCE.

The resulting estimate is then increased by 65.6 percent (15 percent to convert from a fob to a cif valuation, 20 percent for customs duties, and 20 percent for trade and transport margins) to record these items at purchasers' prices.

It is assumed no Transport Equipment is produced in Somalia.

The resulting benchmark ($139m) reflects GCF of Transport Equipment undertaken in 2017.

This method is sub-optimal, and suggests GCF is the lowest quality of the expenditure measure of GDP's components. An improved method is expected when a time series of business accounts are available.

ICT equipment, Other machinery and equipment

Estimates have been compiled using imports of "Capital goods (except transport equipment)" (BEC Category 41) identified within the UN ComTrade database. Somalia's imports have been obtained by summing exports to Somalia by reporting countries.

The resulting estimate is then increased by 35.4 percent (15 percent to convert from a fob to a cif valuation, 7 percent for customs duties, and 10 percent for trade and transport margins) to record these items at purchasers' prices.

It is assumed no ICT equipment, Other machinery and equipment is produced in Somalia.

The resulting benchmark ($228m) reflects GCF of ICT equipment, Other machinery and equipment undertaken in 2017.

This method is sub-optimal, and suggests GCF is the lowest quality of the expenditure measure of GDP's components. An improved method is expected when a time series of business accounts are available.

Annual Estimates outside the Benchmark

Benchmarks for all periods spanned by the time series are compiled using the same method described above. This is possible as the UN ComTrade database maintains a time series.

The constant price series are obtained by summing constant price estimates for all three components of GCF. Constant price series for the relevant components are constructed via price deflation with the following deflators:

ASSET	DEFLATOR
Dwellings, Other buildings and structures	U.S. Export Price Indexes, by End Use – Selected building materials
Transport equipment	U.S. Export Price Indexes, by End Use – Capital goods
ICT equipment, Other machinery and equipment	U.S. Export Price Indexes, by End Use – Automotive vehicles, parts and engines

Exports and imports of goods and services

Concept

Exports and imports of goods and services "are recorded when there is a change of economic ownership from a unit in one economy to a unit in another country" (2008 SNA para 26.49). Examples include: sales of livestock to Somalia's trading partners (exports of goods), commission based sales of a non-resident's goods (exports of services), imports of fuel (imports of goods), and fees paid to non-resident banks (imports of services).

Source

- Balance of Payments compiled by the Central Bank of Somalia
- Somaliland Livestock Management Information System
- Customs data from Mogadishu and Puntland
- US Export Price Indexes
- SNBS Consumer Price Index
- Somaliland Consumer Price Index
- SOS per USD exchange rate published by Central Bank of Somalia
- SLS per USD exchange rate published by Central Bank of Somaliland

Method

Current price estimates are obtained by summing goods and services as reported in Balance of Payments compiled by Central Bank of Somalia. This ensures consistency of Somalia's system of macroeconomic statistics.

Exports of Livestock

An unpublished time series for exports of livestock has been compiled for the period (2012 – 2018). It uses data from Livestock Management Information Systems (LMIS) maintained by Somaliland over this period and customs data from Mogadishu

and Puntland (Annex 4). The series has not been maintained beyond 2018 as the LMIS is no longer maintained. The series provides estimates in current and constant prices.

Exports of Goods (excl. Livestock) and Exports of Services

Constant price estimates are constructed via price deflation with the following deflator:

$$0.7 \times CPI_{SNBS,t} \times \frac{SOS\ per\ USD_t}{SOS\ per\ USD_{2017}} + 0.3 \times CPI_{SOMALILAND,t} \times \frac{SLS\ per\ USD_t}{SLS\ per\ USD_{2017}}$$

where:

- $CPI_{SNBS,t}$ refers to the CPI All Groups published by Somalia National Bureau of Statistics in year t
- $CPI_{SOMALILAND,t}$ refers to the CPI All Groups published by Somaliland Central Statistics Department in year t
- $SOS\ per\ USD_t$ refers to the Somali Shilling per USD exchange rate published by the Central Bank of Somalia
- $SLS\ per\ USD_t$ refers to the Somaliland Shilling per USD exchange rate published by the Central Bank of Somaliland

The weighting of these components (70 percent Somalia excluding Somaliland / 30 percent Somaliland) reflects an estimate of the relative size of these two regions in 2017.

Imports of Goods

A current price time series has been constructed from UN ComTrade for twelve components as shown in the below table. Each component has been price deflated as shown.

GOOD	DEFLATOR
Food and beverages - Mainly for industry (BEC Category 111 and 121)	$$0.7 \times CPI_{SNBS,t} \times \frac{SOS\ per\ USD_t}{SOS\ per\ USD_{2017}}$$
Food and beverages - Mainly for final consumption (BEC Category 112 and 122)	$$+0.3 \times CPI_{SOMALILAND,t} \times \frac{SLS\ per\ USD_t}{SLS\ per\ USD_{2017}}$$ where: • CPISNBS,t refers to the CPI for Food and non-alcoholic beverages (COICOP Division 01) published by the Somalia National Bureau of Statistics in year t • SOS per USDt refers to the Somali Shilling per USD exchange rate published by the Central Bank of Somalia • CPISOMALILAND,t refers to the CPI for Food and non-alcoholic beverages (COICOP Division 01) published by the Somaliland Central Statistics Department in year t • SLS per USDt refers to the Somaliland Shilling per USD exchange rate published by the Central Bank of Somaliland
Industrial supplies not elsewhere specified (BEC Category 2)	
Fuels and lubricants (BEC Category 3)	
Capital goods (except transport equipment), and parts and accessories thereof – Capital good (BEC Category 41)	
Capital goods (except transport equipment), and parts and accessories thereof - Parts and accessories (BEC Category 42)	$$0.7 \times CPI_{SNBS,t} \times \frac{SOS\ per\ USD_t}{SOS\ per\ USD_{2017}}$$
Transport equipment and parts and accessories thereof - Passenger motor vehicles (BEC Category 51)	$$+0.3 \times CPI_{SOMALILAND,t} \times \frac{SLS\ per\ USD_t}{SLS\ per\ USD_{2017}}$$ where: • CPISNBS,t refers to the CPI for Food and non-alcoholic beverages (COICOP Division 01) published by the Somalia National Bureau of Statistics in year t
Transport equipment and parts and accessories thereof - Other (BEC Category 52)	
Transport equipment and parts and accessories thereof - Parts and accessories (BEC Category 53)	• SOS per USDt refers to the Somali Shilling per USD exchange rate published by the Central Bank of Somalia
Consumer goods not elsewhere specified – Durable (BEC Category 61)	• CPISOMALILAND,t refers to the CPI for Food and non-alcoholic beverages (COICOP Division 01) published by the Somaliland Central Statistics Department in year t
Consumer goods not elsewhere specified Semi-durable and non-durable (BEC Categories 62 and 63)	
Goods not elsewhere specified (BEC Category 7)	• SLS per USDt refers to the Somaliland Shilling per USD exchange rate published by the Central Bank of Somaliland

A current price and constant price series are constructed by summation (of the respective current and constant price series) of all twelve components.

A deflator has been obtained as the ratio of the current price and constant price series.

A constant price series for imports of goods has been obtained by price deflation (of the imports of goods series provided by Central Bank of Somalia) with the above deflator.

Imports of Services

A series for imported transport and insurance services has been estimated. This series has been estimated as fifteen percent of imported BEC goods.

A constant price series for the remainder (imports of services reported by Central Bank of Somalia less estimated transport and insurance services) is constructed via price deflation with the following deflator:

$$0.7 \times CPI_{SNBS,t} \times \frac{SOS \ per \ USD_t}{SOS \ per \ USD_{2017}} + 0.3 \times CPI_{SOMALILAND,t} \times \frac{SLS \ per \ USD_t}{SLS \ per \ USD_{2017}}$$

where:

- CPI$_{SNBS,t}$ refers to the CPI for All Group excluding Food and non-alcoholic beverages published by the Somalia National Bureau of Statistics in year t
- SOS per USDt refers to the Somali Shilling per USD exchange rate published by the Central Bank of Somalia
- CPI$_{SOMALILAND,t}$ refers to the CPI for All Groups excluding Food published by the Somaliland Central Statistics Department in year t
- SLS per USDt refers to the Somaliland Shilling per USD exchange rate published by the Central Bank of Somaliland

The constant price series for imports of services is obtained by summation of these two subcomponents.

Conclusion: Future developments

Somalia's national accounts statistics have made substantial progress since 2012. Initial series were compiled in consultation with the International Monetary Fund (the Fund), based on negligible source data. These series were published on the Fund's website as staff estimates.

The establishment of the SNBS in 2020[6] marked a pivotal moment in the history of Somalia's national accounts statistics. An independent national statistics office, staffed by a permanent team, has enabled substantial progress over the last eighteen months. Significant achievements include the implementation of data from the FGS Ministry of Finance when compiling government final consumption expenditure, and the alignment of exchange rates, exports and imports with Balance of Payments statistics published by the Central Bank of Somalia.

Somalia's national accounts remain in need of development, with further improvements expected as the capacity of SNBS and the quality of Somalia's source data improves. Some specified improvements expected over the coming years include:

- **Implementation of a contemporary benchmark for GDP.** As Somalia's current benchmark and base year is 2017, real GDP is estimated by combining quantities using relative prices of 2017. This also means the last estimates of household consumption was observed in 2017, with subsequent estimates based on incomplete source data and assumptions. International best practice recommends updating the base year every five years, and thus SNBS intends to implement the Integrated Household Budget Survey, 2022 into the national accounts during 2023 and published a rebased GDP time series in 2024.

- **Expanding the suite of national accounts statistics to compile GDP using the production measure.** The SNBS is currently working with key partners, including the FGS Ministry of Finance to obtain business accounting data. Another key source is data for Somalia's financial corporations held by the Central Bank of Somalia, and agriculture data held by the Ministry of Agriculture.

- **Improvements to source and methods.** As Somalia's source data evolves, the SNBS will be able to implement improved methods. Future opportunities include: examination of Somalia's customs data to replace existing assumptions with observed customs duty and insurance and freight charges, and revising series (such as general government consumption of fixed capital) to reflect international best practice. Another key consideration is the estimation of cultivated biological resources based on data from the Integrated Household Budget Survey, 2022 of a future agricultural census.

- **Developing quarterly GDP.** The production of a quarterly GDP time series is heavily dependent upon the availability of suitable quarterly data. Potential data sources include business income and expenses reported to FGS Ministry of Finance via any future business reporting, and estimation of household consumption based on changes in Somalia's customs data. The SNBS continues to work with its partners to ensure statistical requirements can be satisfied as Somalia's regulatory environment evolves.

The SNBS is grateful for assistance from its development partners and welcomes feedback to improve the quality of its published national accounts statistics.

[6]Law No: 24 – National Statistics Law (February, 2020), https://www.nbs.gov.so/somali-statistics-law/

Annex 1: Concept, Source and Method for Somalia's estimated resident population

Concept

A household is a "group of persons who share the same living accommodation, who pool some, or all, of their income and wealth and who consume certain types of goods and services collectively, mainly housing and food" (2008 SNA para 4.4). Resident households are those for with a common "economic territory with which it has [they have] the strongest connection, in other words, its [their] centre of predominant economic interest" (2008 SNA para 4.10). Somalia's economic territory comprises all eighteen administrative regions.

Estimated resident population is a stock measured at a point in time, while GDP is a flow measured between two points of time. Somalia's GDP is the sum of all relevant transactions that occur within a given calendar year (eg. 2014). Somalia's population during a calendar year is not constant, and can therefore be recorded at multiple points in time (eg. the start, mid-point, or end of the calendar year). International best practice is for population to be recorded at the mid-point of the calendar year to estimate related national accounts statistics such as GDP per capita.

Somalia's estimated resident population is the number of persons comprising Somalia's resident households. It includes Somali citizens who reside in their owner-occupied accommodation within Somalia, Somalia's nomads, Somali diplomats located outside Somalia, long term foreign students and workers, and all internally displaced persons located within Somalia. It excludes international military forces, peacekeeping officials, and foreign diplomats located within Somalia.

Estimated population from the Population Estimation Survey (PESS) measures physical residency within Somalia's geographical territory. It is similar, but not identical to estimated resident population.

Source

• Population Estimation Survey (PESS), 2014

Method

Somalia's estimated resident population is estimated from the PESS, 2014. Estimates for the urban and rural population were recorded in October 2013, Internally Displaced Persons relate to June 2013, and estimates for the nomadic population were recorded in March 2014. While the Population Estimation Survey of Somalia results are frequently "Population Estimation Survey of Somalia, 2014" (the date of publication) and used on this basis for many purposes, this use is inconsistent with international best practice for national accounts statistics.

Somalia's estimated resident population records all subgroups at the mid-point of the calendar year and the time of recording. This is achieved by applying an (assumed) annual growth rate (2.8 percent) across all periods of the calendar year. In order to achieve a 2.8 percent annual growth rate, each month must grow by 0.230 percent[7]. This amount is used to convert from the date of recording to the mid-point of the calendar year as shown in the below table. The estimate of population as recorded in Somalia's national accounts statistics for 2014 (12,519,038) will not match the Population Estimation Survey of Somalia (12,316,895).

Estimates for all other calendar years assume a 2.8 percent annual growth rate as estimated in the PESS, 2014.

	PESS, 2014 (persons)	TIME OF RECORDING	MONTHS TO MID-POINT 2014	2013	2014	2015	2016	2017
Urban	5,216,392	October 2013	8	5,168,595	5,313,316	5,462,089	5,615,027	5,772,248
Rural	2,806,787	October 2013	8	2,781,069	2,858,939	2,938,989	3,021,281	3,105,877
IDPs[8]	1,106,751	July 2013	12	1,106,751	1,137,740	1,169,597	1,202,345	1,236,011
Nomads	3,186,965	March 2014	3	3,121,637	3,209,043	3,298,896	3,391,266	3,486,221
TOTAL	**12,316,895**			**12,178,052**	**12,519,038**	**12,869,571**	**13,229,919**	**13,600,357**

[7]The geometric mean ($1.028^{(1/12)}$ = 0.230 percent increase) is used to derive the monthly population growth rate - this assumes the population grows at a constant rate in each month. The common practice of using an arithmetic mean (2.8/12 = 0.233) assumes the population grows at a constant amount (and therefore reducing rate) in each month.

[8]Internally Displaced Persons

Annex 2: Ten frequently asked questions

1. Why is GDP measured in USD rather than domestic currency?

Somalia's national accounts are measured in USD as the majority of transactions undertaken in Somalia's economy denominated in USD. Examples include: all transactions between the Central Bank of Somalia and FGS, most imports and exports of goods and services, and large capital purchases.

Somalia's CPIs are measured in domestic currency as a significant proportion of transactions involving households are undertaken in domestic currency, not USD. Where the transaction is of low value, the transaction is frequently undertaken in domestic currency. Higher value transactions are most commonly undertaken in USD, typically via a mobile money application.

A primary purpose of Somalia's CPI is supporting the Central Bank of Somalia with monetary policy and stability of Somalia's exchange rate, which is undertaken in domestic currency.

2. Why do Somalia's national accounts apply exchange rates to Somalia's CPIs?

The CPIs published by SNBS and Somaliland measure price changes denominated in domestic currency for transactions that on aggregate predominantly take place in USD. Changes in exchange rates for domestic currency will impact these indexes. All other things equal, appreciation (depreciation) of the domestic currency relative to the USD will decrease (increase) the CPI. A CPI denominated in USD will not change as prices denominated in USD are identical.

Changes in exchange rates for domestic currency do not impact Somalia's national accounts denominated in USD. By way of example, appreciation (depreciation) of the domestic currency has no impact upon GDP. The value of production (measured in GDP in current USD prices) has not changed. There is has been no change in the volume of goods and services produced (measured by changes in GDP in constant USD prices).

The national accounts apply exchange rates to the CPI to ensure changes in real GDP do not occur when there are changes in exchange rates for domestic currency. This is achieved by applying changes in exchange rates to changes in CPIs to ensure they measure price changes denominated in USD, not domestic currency.

3. How does the CPI deal with transactions denominated in USD?

The CPI collects prices denominated in domestic currency. Where the price is denominated in USD, the SNBS must convert this amount to domestic currency prior to inclusion in the CPI. This conversion will be done by the respondent (indicating the amount of domestic currency they are prepared to accept in lieu of the USD price specified when prices are collected) or SNBS (using the exchange rate specified by the Central Bank of Somalia if this does not occur). It is possible the exchange rate reported by the Central Bank of Somalia

4. Why is Estimated Resident Population 2014 in the national accounts different from PESS 2014?

See Annex 1.

5. Why is HFCE per capita in 2017 different from consumption per capita in 2017 recorded by the Somalia High Frequency Survey?

See discussion on Household Final Consumption Expenditure.

6. Why has capital formation reported by FGS Ministry of Finance not been used in the Somalia's national accounts?

Somalia's GDP is based on a benchmark for 2017 when comprehensive estimates of capital formation from FGS Ministry of Finance were not available. These data are now available and will be considered when a new benchmark for GDP is compiled. They cannot be implemented into Somalia's current GDP time series (commencing in 2012) without revisions or breaks to the existing time series.

7. When will GDP be published?

Please refer to the latest schedule at https://www.nbs.gov.so/publishing-calendar/.

8. How does SNBS get data from other sources such as Central Bank of Somalia and Ministry of Finance?

The SNBS works co-operatively with the FGS Ministry of Finance and Central Bank of Somalia. This co-operative relationship is supported by Law No: 24 – National Statistics Law (February, 2020).

9. Are there plans to publish quarterly GDP?

Quarterly GDP will be compiled and published once suitable source data is available to measure changes between quarters. The SNBS continues to work with its partners including Ministry of Finance (government financial data), and Customs Service (imports and exports). The SNBS may also undertake quarterly surveys where source data is unavailable (eg. capital formation).

10. What are the plans of SNBS to rebase GDP?

As Somalia's current benchmark and base year is 2017, real GDP is estimated by weighting together volume series using the relative prices of 2017. This also means the last estimates of household consumption were observed in 2017, with subsequent estimates based on incomplete source data and assumptions. International best practice recommends a benchmarking exercise and an update to the base year every five years, and thus SNBS intends to implement the Integrated Household Budget Survey, 2022 into the national accounts during 2023 and publish a rebased GDP time series in 2024, with a new base year.

Annex 3: Summary of Somali High Frequency Survey

Three iterations of the SHFS have been conducted – Somaliland (2013), Wave I (2016), and Wave II (2017-2018). Estimates for Somaliland collected in 2013 are not representative of Somalia and have not been considered further. The daily per capita consumption from Wave I ($1.73) and Wave II ($1.26) are significantly different.

This annex lists five significant differences between Wave I and Wave II the SNBS considered when using Wave II to compile the 2017 benchmark for GDP.

Difference 1: Estimates are subject to seasonal variation as they have been collected at different points of time. Wave I's consumption data was collected prior to the Gu season (February – March 2016), while Wave II was collected during the Deyr season (November 2017 – January 2018). The published SHFS results have not attempted to account for seasonal variation based on comparable data in neighboring countries and/or weather patterns.

Difference 2: During Wave II's enumeration (November 2017 – January 2018), many regions of Somalia were experiencing a drought considered more severe than average. Initial estimates suggest consumption of rural households in Wave II was significantly lower than usual due to the drought. The difference was less material in urban areas, likely due to access to imported food.

Difference 3: Wave II has greater geographical coverage. Wave I was collected from households in eight of Somalia's regions. Wave II was collected from households in sixteen of Somalia's regions.

Difference 4: Wave II has greater coverage of Somalia's population. Wave II includes (and Wave I excludes) all nomads. The Population Estimation Survey showed nomads comprised 25.9 percent (3.2 million of 12.3 million people estimated during late 2013 / early 2014) of Somalia's population.

Difference 5: Prices changed between Wave I and Wave II. After adjusting to foreign currency, the CPI for Somaliland fell by 16.3 percent between March 2016 (end of Wave I collection) and December 2017 (mid-point of Wave II collection).

Annex 4: Unpublished time series for exports of Livestock

Livestock comprises three sub-categories – Cattle, Camels, and Sheep & Goats.

Mogadishu and Puntland

Customs data provided by Mogadishu and Puntland provides the following data items:

• Headcount of exported sub-category (number per calendar year)
• Average price for each sub-category over the calendar year (USD)

The value of each exported sub-category is the product of these two items.

Exported livestock from Mogadishu and Puntland is obtained by summation of each exported sub-category.

Somaliland

The LMIS maintained by Somaliland to 2018 provided the following data items:

• Headcount of exported sub-category leaving Berbera port (number per calendar year)
• Headcount of exported sub-category leaving Somaliland for Djibouti (number per calendar year)
• Average price for twenty-six livestock types over the calendar year (USD)

CATTLE	CAMELS	SHEEP & GOATS
Tog Wajaale - Mature Grade 1 [25 percent]	Hargeisa - Mature Grade 1 [2 percent]	Hargeisa - Small Ruminants Grade 1
Tog Wajaale - Mature Grade 2 [25 percent]	Hargeisa - Mature Grade 2 [2 percent]	Hargeisa - Small Ruminants Grade 2
Tog Wajaale - Intermediate [25 percent]	Hargeisa – Intermediate [9 percent]	Hargeisa - Small Ruminants Grade 3
Tog Wajaale - Immature Grade 1 [15 percent]	Hargeisa - Immature Grade 1 [10 percent]	Burao - Small Ruminants Grade 1
Tog Wajaale - Immature Grade 2 [10 percent]	Hargeisa - Immature Grade 2 [10 percent]	Burao - Small Ruminants Grade 2
	Burao - Mature Grade 1 [2 percent]	Burao - Small Ruminants Grade 3
	Burao - Mature Grade 2 [2 percent]	
	Burao – Intermediate [9 percent]	
	Burao - Immature Grade 1 [10 percent]	
	Burao - Immature Grade 2 [10 percent]	
	Tog Wajaale - Mature Grade 1 [2 percent]	
	Tog Wajaale - Mature Grade 2 [2 percent]	
	Tog Wajaale – Intermediate [10 percent]	
	Tog Wajaale - Immature Grade 1 [10 percent]	
	Tog Wajaale - Immature Grade 2 [10 percent]	

The average price for each exported sub-category is obtained as the average of the relevant livestock types. Explicit weights are used for Cattle and Camels (shown in the above table). Equal weights are used for Sheep & Goats.

The headcount of exported livestock from Somaliland in each sub-category is obtained by summing exports from Berbera port and exports to Djibouti.

The value of each exported sub-category is the product of the average price and headcount.

Exported livestock from Somaliland is obtained by summation of each exported sub-category.

Exports of Somalia's livestock

Current price estimates are obtained by summation across Mogadishu, Puntland, and Somaliland.

Constant price estimates are compiled via the same method, however the prices of calendar year 2017 are used.